Cat. No. V107-E1-08

NB-series

NB3Q-TW□□B
NB5Q-TW□□B
NB7W-TW□□B
NB10W-TW01B

Programmable Terminals

SETUP MANUAL

OMRON

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NB-series
NB3Q-TW□□B
NB5Q-TW□□B
NB7W-TW□□B
NB10W-TW01B
Programmable Terminals

Setup Manual

Revised April 2013

Introduction

Thank you for purchasing an NB-series Programmable Terminal.

NB-Series Programmable Terminals (PTs) are designed to handle information generated in FA production sites. Be sure to understand the functions and performances etc thoroughly before using PT correctly.

Intended Audience

This manual is intended for the following personnel, who must also have knowledge of electrical systems (an electrical engineer or the equivalent).

- Personnel in charge of introducing FA systems into production facilities.
- Personnel in charge of designing FA systems.
- Personnel in charge of installing and connecting FA facilities.
- Personnel in charge of managing FA systems and facilities

General Precautions

- The user must operate the product according to the performance specifications described in the operation manuals.
- Do not use the PT touch switch input functions for applications where danger to human life or serious property damage is possible, or for emergency switch applications.
- Before using the product under conditions which are not described in the manual or applying the product to nuclear control systems, railroad systems, aviation systems, vehicles, combustion systems, medical equipment, amusement machines, safety equipment, and other systems, machines and equipment that may have a serious influence on lives and property if used improperly, consult your OMRON representative.
- Make sure that the ratings and performance characteristics of the product are sufficient for the systems, machines, and equipment, and be sure to provide the systems, machines, and equipment with double safety mechanisms.
- This manual provides information for connecting and setting up an NB-Series PT. Be sure to read this manual before attempting to use the PT and keep this manual close at hand for reference during installation and operation.

NB-series Manuals

NB-series manuals are organized in the sections listed in the following tables. Refer to the appropriate section in the manuals as required.

Programmable Terminals Setup Manual (Cat. No. V107) (This Manual)

Section	Contents
Section 1 Part Names and Functions	This section describes the names and functions of the various parts of an NB Unit.
Section 2 Installing the NB Unit and Connecting Peripheral Devices	This section describes the methods used to install the NB Unit and connect peripheral devices.
Section 3 System Setting Mode	This section describes the System Setting Mode.
Section 4 Calibrate Mode	This section describes the Calibrate Mode.
Appendices	The appendices provide information on specifications, dimensions, wirings, and lists of the NB Units, the applicable PLCs and options.

Programmable Terminals NB-Designer Operation Manual (Cat. No. V106)

Section	Contents
Section 1 Introduction	This section provides an outline of the NB-series PTs, including their functions, features, connection types and communication methods.
Section 2 Installation and Startup of NB-Designer	This section describes how to install and start the NB-Designer.
Section 3 Functions of NB-Designer	This section describes the functions of NB-Designer.
Section 4 Functions of NBManager	This section describes the functions of NBManager.
Section 5 Maintenance and Abnormality Handling	This section describes the maintenance and check to prevent the abnormality occurrence and the handling of the abnormalities occurred in NB Unit.
Section 6 Descriptions of New Functions Added into NB□□-TW01B	This section describes the new functions added into NB□□-TW01B, the system attributes and the component attributes.
Section 7 Pictbridge Printing	This section describes the Pictbridge printing function.
Appendices	The appendices provide lists of the NB Units, the Communication Units, the applicable PLCs, the registers supported by PLC, and the list of NB-Designer functions.

Programmable Terminals Host Connection Manual (Cat. No. V108)

Section	Contents
Section 1 List for All PLCs Supported by NB series	This section lists all PLCs supported by NB Units.
Section 2 Connecting to SIEMENS PLCs	This section describes the connection to SIEMENS PLCs.
Section 3 Connecting to Mitsubishi PLCs	This section describes the connection to Mitsubishi PLCs.
Section 4 Connecting to Schneider PLCs	This section describes the connection to Schneider PLCs.
Section 5 Modbus Connection	This section describes the connection on Modbus protocol.
Section 6 Connecting to Delta PLCs	This section describes the connection to Delta PLCs.
Section 7 Connecting to LSIS PLCs	This section describes the connection to LSIS PLCs.
Section 8 Connecting to Panasonic Industrial Devices SUNX PLCs	This section describes the connection to Panasonic Industrial Devices SUNX PLCs.
Section 9 Connecting to Allen-Bradley (Rockwell) PLC	This section describes the connection to Allen-Bradley PLC.
Section 10 Connecting to PLC of GE Fanuc Automation Inc.	This section describes the connection to PLC of GE Fanuc Automation Inc.

Programmable Terminals Startup Guide Manual (Cat. No. V109)

Section	Contents
Section 1 NB Overview	This section provide specifications of the NB Unit, describes its names and functions of the various parts.
Section 2 System Design	This section describes the manual structure, takes NB7W as an example to introduce the operation procedures of the NB system.
Section 3 Installation and Wiring	This section describes how to install and wire the NB Unit.
Section 4 Screen Creation	This section describes how to create a demonstration project through NB-Designer.
Section 5 Run	This section describes how to start running at the Host side and prepare to send screen data to NB7W.
Section 6 Maintenance and Troubleshooting	This section describes the maintenance and inspection methods for preventing errors occurring, and troubleshooting measures when errors occur.

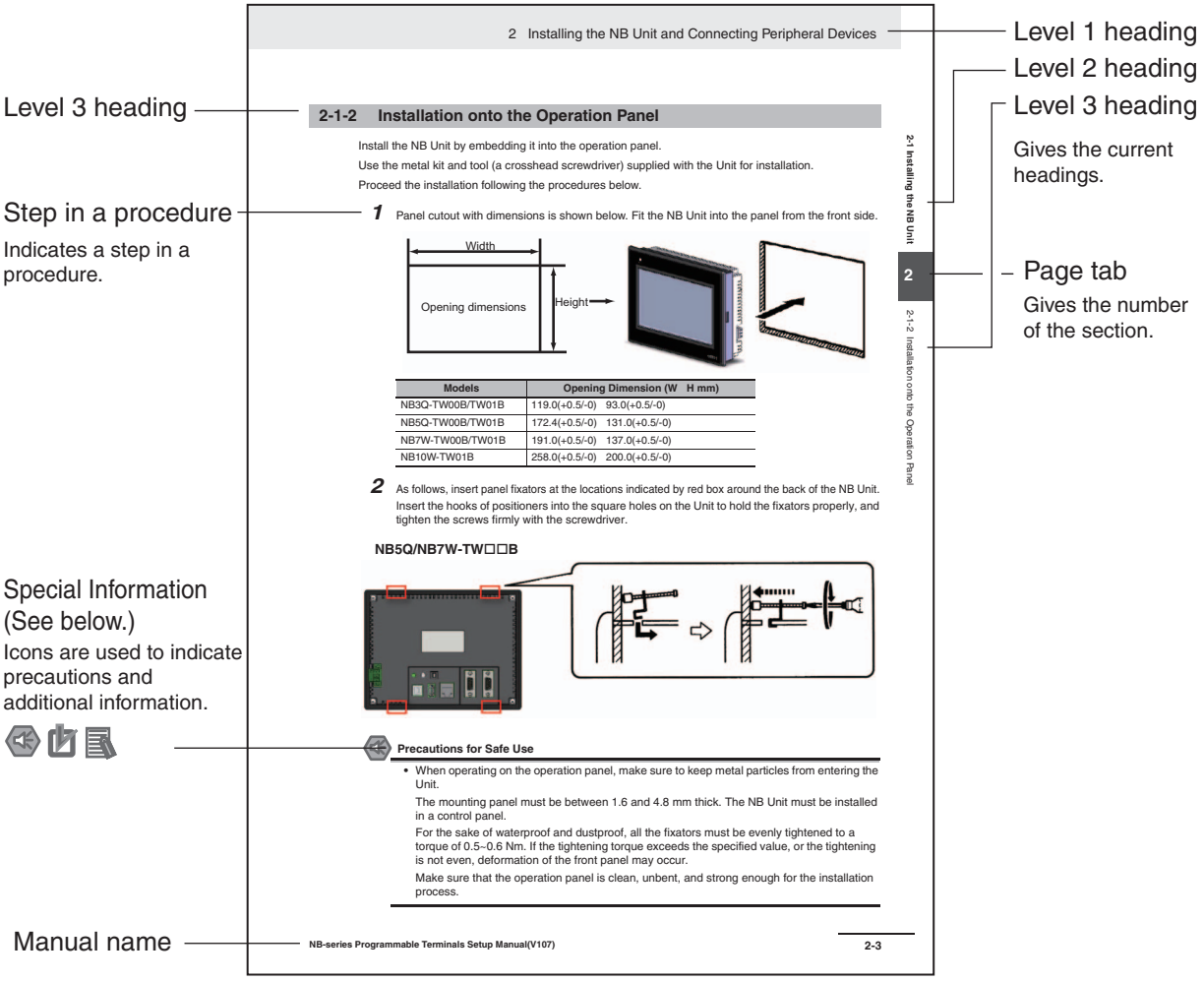
WARNING

Failure to read and understand the information provided in this manual may result in personal injury or death, damage to the product, or product failure. Please read each section in its entirety and be sure you understand the information provided in the section and related sections before attempting any of the procedures or operations given.

Manual Structure

Page Structure and Icons

The following page structure and icons are used in this manual.


2 Installing the NB Unit and Connecting Peripheral Devices
Level 1 heading
Level 2 heading
Level 3 heading
Gives the current headings.
Level 3 heading
2-1-2 Installation onto the Operation Panel
Step in a procedure
Indicates a step in a procedure.
1 Panel cutout with dimensions is shown below. Fit the NB Unit into the panel from the front side.
Width
Height
Opening dimensions
Models
Opening Dimension (W H mm)
NB3Q-TW00B/TW01B 119.0(+0.5/-0) 93.0(+0.5/-0)
NB5Q-TW00B/TW01B 172.4(+0.5/-0) 131.0(+0.5/-0)
NB7W-TW00B/TW01B 191.0(+0.5/-0) 137.0(+0.5/-0)
NB10W-TW01B 258.0(+0.5/-0) 200.0(+0.5/-0)
2 As follows, insert panel fixators at the locations indicated by red box around the back of the NB Unit. Insert the hooks of positioners into the square holes on the Unit to hold the fixators properly, and tighten the screws firmly with the screwdriver.
NB5Q/NB7W-TW□□B
Special Information (See below.)
Icons are used to indicate precautions and additional information.
Precautions for Safe Use
When operating on the operation panel, make sure to keep metal particles from entering the Unit.
The mounting panel must be between 1.6 and 4.8 mm thick. The NB Unit must be installed in a control panel.
For the sake of waterproof and dustproof, all the fixators must be evenly tightened to a torque of 0.5~0.6 Nm. If the tightening torque exceeds the specified value, or the tightening is not even, deformation of the front panel may occur.
Make sure that the operation panel is clean, unbent, and strong enough for the installation process.
Manual name
NB-series Programmable Terminals Setup Manual(V107)
2-3
2-1 Installing the NB Unit
2
2-1-2 Installation onto the Operation Panel
Page tab
Gives the number of the section.

This illustration is provided only as a sample and may not literally appear in this manual.

Special Information

Special information in this manual is classified as follows:

Precautions for Safe Use
Precautions on what to do and what not to do to ensure using the product safely.

Precautions for Correct Use
Precautions on what to do and what not to do to ensure proper operation and performance.

Additional Information
Additional information to increase understanding or make operation easier.

Terminology

The following terminology is used in this manual.

Terms	Descriptions
NB Unit	Indicates the main Unit of the products in the OMRON NB Series of Programmable Terminal.
NB Series	Indicates products in the OMRON NB□□ Series of Programmable Terminal. In this manual, unless otherwise specified, NB□□ Series is taken as the subject concerned.
PLC	Indicates a Programmable Controller.
CP Series	Indicates the following products in the OMRON CP Series of Programmable Controllers: CP1H, CP1L, CP1E
CS/CJ Series	Indicates the following products in the OMRON CS/CJ Series of Programmable Controllers: CS1G, CS1H, CS1G-H, CS1H-H, CJ1G, CJ1M, CJ2M, CJ2H
NJ Series	Indicates the following OMRON SYSMAC NJ Series of Programmable Controllers: NJ501, NJ301
C Series	Indicates the following products in the OMRON C Series of Programmable Controllers: C200HX(-Z), C200HG(-Z), C200HE(-Z), CQM1, CQM1H, CPM1A, CPM2A, CPM2C
Serial Communication Unit	Indicates a Serial Communication Unit for an OMRON SYSMAC CS/CJ-Series PLC.
Serial Communication Board	Indicates a Serial Communication Board for an OMRON SYSMAC CS/CJ-Series PLC.
Communication Board	Indicates a Communication Board for an OMRON C200HX/HG/HE(-Z) PLC.
CPU Unit	Indicates a CPU Unit in the OMRON CP, CS/CJ or SYSMAC C Series of Programmable Controllers.
NB-Designer	Indicates the OMRON NB-Designer.
Host	Indicates the PLC and other units functioning as the control devices for NB-Series Units.
PT	Indicates an OMRON Programmable Terminal.

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Read and Understand this Manual

Please read and understand this manual before using the product. Please consult your OMRON representative if you have any questions or comments.

Warranty and Limitations of Liability

WARRANTY

OMRON's exclusive warranty is that the products are free from defects in materials and workmanship for a period of one year (or other period if specified) from date of sale by OMRON.

OMRON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, REGARDING NON-INFRINGEMENT, MERCHANTABILITY, OR FITNESS FOR PARTICULAR PURPOSE OF THE PRODUCTS. ANY BUYER OR USER ACKNOWLEDGES THAT THE BUYER OR USER ALONE HAS DETERMINED THAT THE PRODUCTS WILL SUITABLY MEET THE REQUIREMENTS OF THEIR INTENDED USE. OMRON DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED.

LIMITATIONS OF LIABILITY

OMRON SHALL NOT BE RESPONSIBLE FOR SPECIAL, INDIRECT, OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED ON CONTRACT, WARRANTY, NEGLIGENCE, OR STRICT LIABILITY.

In no event shall the responsibility of OMRON for any act exceed the individual price of the product on which liability is asserted.

IN NO EVENT SHALL OMRON BE RESPONSIBLE FOR WARRANTY, REPAIR, OR OTHER CLAIMS REGARDING THE PRODUCTS UNLESS OMRON'S ANALYSIS CONFIRMS THAT THE PRODUCTS WERE PROPERLY HANDLED, STORED, INSTALLED, AND MAINTAINED AND NOT SUBJECT TO CONTAMINATION, ABUSE, MISUSE, OR INAPPROPRIATE MODIFICATION OR REPAIR.

Application Considerations

SUITABILITY FOR USE

OMRON shall not be responsible for conformity with any standards, codes, or regulations that apply to the combination of products in the customer's application or use of the products.

At the customer's request, OMRON will provide applicable third party certification documents identifying ratings and limitations of use that apply to the products. This information by itself is not sufficient for a complete determination of the suitability of the products in combination with the end product, machine, system, or other application or use.

The following are some examples of applications for which particular attention must be given. This is not intended to be an exhaustive list of all possible uses of the products, nor is it intended to imply that the uses listed may be suitable for the products:

- Outdoor use, uses involving potential chemical contamination or electrical interference, or conditions or uses not described in this manual.
- Nuclear energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, and installations subject to separate industry or government regulations.
- Systems, machines, and equipment that could present a risk to life or property.

Please know and observe all prohibitions of use applicable to the products.

NEVER USE THE PRODUCTS FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCTS ARE PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

PROGRAMMABLE PRODUCTS

OMRON shall not be responsible for the user's programming of a programmable product, or any consequence thereof.

Disclaimers

CHANGE IN SPECIFICATIONS

Product specifications and accessories may be changed at any time based on improvements and other reasons.

It is our practice to change model numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the products may be changed without any notice. When in doubt, special model numbers may be assigned to fix or establish key specifications for your application on your request. Please consult with your OMRON representative at any time to confirm actual specifications of purchased products.

DIMENSIONS AND WEIGHTS

Dimensions and weights are nominal and are not to be used for manufacturing purposes, even when tolerances are shown.

PERFORMANCE DATA

Performance data given in this manual is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of OMRON's test conditions, and the users must correlate it to actual application requirements. Actual performance is subject to the OMRON Warranty and Limitations of Liability.

ERRORS AND OMISSIONS

The information in this manual has been carefully checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical, or proofreading errors, or omissions.

Safety Precautions

Notation Used for Safety Information

The following notation is used in this manual to provide precautions required to ensure safe usage of the product. The safety precautions that are provided are extremely important to safety. Always read and heed the information provided in all safety precautions.

WARNING	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. Additionally, there may be severe property damage.

Precautions for Safe Use
Indicates precautions on what to do and what not to do to ensure using the product safely.

Precautions for Correct Use
Indicates precautions on what to do and what not to do to ensure proper operation and performance.

Note Indicates suggestive information and precautions on operation of the product.

Symbols

- Prohibition
  Indicates a general prohibition.

- Caution
  Indicates general cautionary, warning, or danger level information.

⚠ WARNING

Do not attempt to take the product apart and do not touch the product inside while the power is being supplied. Otherwise it may result in electric shock.

Always ensure that the personnel in charge confirm that installation, inspection, and maintenance were properly performed for the NB Unit.

"Personnel in charge" refers to individuals qualified and responsible for ensuring safety during machine design, installation, operation, maintenance, and disposal.

Ensure that installation and post-installation checks are performed by personnel in charge who possess a thorough understanding of the machinery to be installed.

Do not use the input functions of the touch switch, etc. of the NB Unit, in applications that involve human life, in applications that may result in serious injury, or for emergency stop switches.

Do not attempt to disassemble, repair, or modify the NB Unit. Otherwise it may impair the safety functions.

Never press more than two points on the touch panel of the NB Unit at a time. Otherwise, it may activate a switch somewhere between the two points.

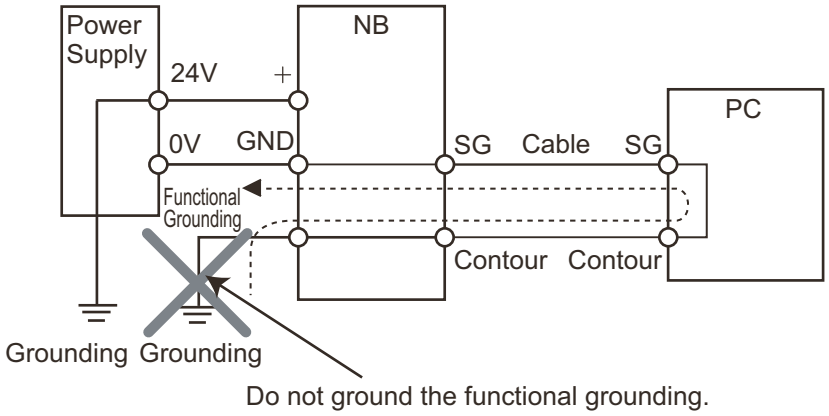
Precaution

⚠ Caution

Wiring

In the case of the NB Series, when grounding the positive terminal of power supply of 24 V to the NB, do not ground functional grounding terminal at NB side. Some functions of a PC connected to the NB may cause a short circuit and the NB Unit may cause damage.

- Caution:
  Depending on the types of PC, SG terminals of RS-232C port or USB port and contour of connector can be connected. As the contour of tool port of the NB and the functional grounding terminal are not insulated, they are connected. Therefore, connecting the PC allows GND terminal and functional grounding terminal of the NB to be connected. If the power supply of 24V to the NB is grounded positively, grounding the functional grounding terminal allows a short circuit as shown in the diagram below and may result in damage.



Test Function

The Test Function is performed on PC so that a problem may occur affected by the timing or the differences with communication route. When the test function is performed, considering possible unexpected circumstances on PC, confirm that any dangerous event will not occur beforehand.

Precautions for Safe Use

- When unpacking the NB Units and the peripheral devices, check carefully for any external scratches or other damages. Also, shake the Units gently and check for any abnormal sound.
- The NB Unit must be installed in a control panel.
- The mounting panel must be between 1.6 and 4.8 mm thick. Tighten the Mounting Brackets evenly to a torque of between 0.5 and 0.6 N·m to maintain water and dust resistance. If the tightening torque exceeds the specified value, or the tightening is not even, deformation of the front panel may occur. What is more, make sure the panel is not dirty or warped and that it is strong enough to hold the Units.
- Do not let metal particles enter the Units when preparing the panel.
- Do not connect an AC power supply to the DC power terminals.
- Use a DC power with a slight voltage fluctuation and reinforced or double insulation, and that will provide a stable output even if the input is momentarily interrupted for 10 ms.
  Rated Power Supply Voltage: DC 24 V (Allowable range DC 20.4 ~ 27.6 V)
- Do not perform a dielectric voltage test.
- Before connecting the power supply to the NB unit, mount the cable on the terminal block. Make the connection by using terminal screws crimping on a twisted-pair cable with a crimping range of 12~26 AWG, and only 6.5 mm of insulation peel of the cable needs to be peeled off. Tighten the terminal screws at a torque of between 0.3 and 0.5 N·m. Make sure the screws are properly tightened. Do not use the terminal block of NB3Q-TW□□B for other models. NB3Q-TW□□B has different pin definitions on the terminal block.
- To prevent malfunctions caused by noise, ground the Unit correctly.
- Do not touch the packaging part of the circuit board with your bare hands. Discharge any static electricity from your body before handling the board.
- When using the No. 6 pin of the serial communication port COM1 connector for a voltage of DC+5V, make sure the supply equipment's current capacity is below 250mA before using it. The DC+5V voltage output of the NB unit is +5V±5%, and the maximum current is 250mA. (The serial communication port COM1 of NB3Q-TW□□B is unable to output the current.)
- Turn OFF the power supply before connecting or disconnecting cables.
- Always keep the connector screws firmly tightened after the communication cable is connected.
- The maximum tensile load for cables is 30 N. Do not apply loads greater than this.
- Confirm the safety of the system before turning ON or OFF the power supply, or pressing the reset button.
- The whole system may stop depending on how the power supply is turned ON or OFF. Turn ON/OFF the power supply according to the specified procedure.
- Reset by pressing the reset button, or restart the power supply, once the DIP switch settings are changed.
- To ensure the system's safety, make sure to incorporate a program that can confirm the normal functionality of the NB Unit before running the system.
- Start actual system application only after sufficiently checking screen data, macros and the operation of the program at the host side.
- Do not press the touch panel with a force greater than 30 N.
- Do not use hard or pointed objects to operate or scrub the screen, otherwise, the surface of the screen may be damaged.
- Confirm the safety of the system before pressing the touch panel.
- Signals from the touch switches may not be input if the touch switches are pressed consecutively at high speed. Confirm each input before proceeding to the next one.
- Do not accidentally press the touch panel when the backlight is not lit or when the display does not appear. Make sure of the safety of the system before pressing the touch panel.
- To use numeric input functions safely, always make maximum and minimum limit settings.
- Before initializing screen data, confirm that existing data is backed up at the NB-Designer.

- When changing the password with the screen, do not reset or turn OFF the power supply until writing is finished. Failure to save the password may cause the screen to fail to function.
- When using an equipment monitor, confirm the safety of the system before carrying out the following operations:
  - Changing monitor data.
  - Changing operation mode.
  - Forced set/reset.
  - Changing the current value or the set value.
- Do not connect a USB connector to any device that is not applicable.
- When connecting the equipment with the USB HOST connector, make sure the supply equipment's current capacity is below 150mA before using it. The DC+5V voltage output of the NB Unit is +5V±5%, and the maximum current is 150mA.
- Before connecting a USB connector to a device, make sure that the device is free of damage.
- Commercially available and the recommended USB HUBs are different from the general specifications of the NB Unit. The unit may not function well in an environment subject to noise, static electricity. Therefore, when using a USB HUB, employ sufficient noise and static electricity insulation measures, or install it at a site free of noise or static electricity.
- While uploading or downloading screen data or system programs, do not perform the following operations that may corrupt the screen data or the system program:
  - Turning OFF the power supply of the NB Unit.
  - Pressing the PT's reset switch.
- Dispose of the Units and batteries according to local ordinances as they apply.

- Do not dispose the product into a fire. Doing so may cause the damage with the battery or electronic components.
- Do not apply an impact with the lithium cell, charge it, dispose it into a fire, or heat it. Doing either of them may cause an ignition or a bursting.
- When exporting products with lithium primary batteries containing perchlorate at 6ppb or above to or delivering them through California, USA, the following precautionary measures have to be publicized. Perchlorate material - applicable through special processing. Refer to http://www.dtsc.ca.gov/hazardouswaste/perchlorate.
  NB-Series products contain lithium primary batteries. When exporting products containing this kind of batteries to or delivering them through California, USA, label all the product packages as well as the appropriate delivery packages.
- Do not use benzene, paint thinner, or other volatile solvents, and do not use chemically treated cloths.
- Do not dispose the Units together with general waste at waste yards. When disposing them, follow the related local ordinances or rules.
- Cannot replace the backlight lamp inside the NB Unit.
- Deterioration over time can cause the touch points to move. Calibrate the touch panel periodically.
- Water and oil resistance will be lost if the front sheet is torn or is peeling off. Do not use the Unit, if the front sheet is torn or is peeling off.
- The rubber packing will deteriorate, shrink, or harden depending on the operating environment. Inspect the rubber packing periodically.
- The communication cables of the COM1 and COM2 connectors are not interchangeable. Confirm the pins of the ports before carrying out communications. (NB3Q-TW□□B only has COM1.)
- Periodically check the installation conditions in applications where the PT is subject to contact with oil or water.
- Do not perform the following operations during the communication of the USB memory:
  - Turning off the power supply of the NB Unit.
  - Pressing the Reset button on the NB Unit.
  - Removing the USB memory.
- Do not use the USB memory in the environment subject to strong vibration.

Precautions for Correct Use

- Do not install the unit in any of the following locations:
  Locations subject to severe changes in temperature
  Locations subject to temperatures or humidity outside the range specified in the specifications
  Locations subject to condensation as the result of high humidity
  Locations subject to corrosive or flammable gases
  Locations subject to strong shock or vibration
  Locations outdoors subject to direct wind and rain
  Locations subject to strong ultraviolet light
  Locations subject to dust
  Locations subject to direct sunlight
  Locations subject to splashing oil or chemicals

- Take appropriate and sufficient countermeasures when installing systems in the following locations:
  Locations subject to static electricity or other forms of noise
  Locations subject to strong electric field or magnetic field
  Locations close to power supply lines
  Locations subject to possible exposure to radioactivity

- Precautions for software:
  The update, restoration, uninstall and reinstallation of software in running status is prohibited in order to guarantee the correct use of the product.

Conformance to EC Directives

NB-Series Programmable Terminals are EMC compliant.

Concepts

OMRON products are electronic devices that are incorporated in machines and manufacturing installations. OMRON PTs conform to the related EMC Directives (see note) so that the devices and machines into which they are built can more easily conform to EMC Directives. The actual products have been through inspections and are completely in accordance with EMC directives. However, when they are built into customers' systems, whether the systems also comply with these Directives is up to the customers for further inspection.

EMC-related performance of OMRON PTs will vary depending on the configuration, wiring, and other conditions of the OMRON equipment or control panel. The customer must, therefore, perform final checks to confirm that the overall machine or device conforms to EMC standards.

Note The applicable EMC (Electromagnetic Compatibility) standards are as follows:
EMS (Electromagnetic sensitivity): EN61131-2: 2007
EMI (Electromagnetic Interference): EN61131-2: 2007

Conformance to EC Directives

NB-Series Programmable Terminals are EC compliant. Heed the following precautions in order to ensure that the customer's overall machine and device conform to EC Directives.

1 The PT must be installed in a control panel.

2 You must use reinforced insulation or double insulation for the DC power supply and the DC power supply must have minimal voltage fluctuations and provide a stable output even if the power supply input is interrupted for 10 ms.

3 The PTs conform to the standard EN 61131-2, but radiated emission characteristics (10m regulations) may vary depending on the configuration of the control panel used, other devices connected to the control panel, wiring, and other conditions. You must therefore confirm that the overall machine or equipment complies with EC Directives.

4 This is a Class A product (Product for industry purpose). It may cause radio interference in residential areas, in which case the user may be required to take adequate measures to reduce interference.

Related Manuals

The related manuals are as follows:

Devices and Software	Manual Name	Manual No.
NB series	NB Series NB-Designer Operation Manual	V106
	NB Series Setup Manual (This manual)	V107
	NB Series Host Connection Manual	V108
	NB Series Startup Guide	V109
PLC	SYSMAC CP Series CP1L CPU Unit Operation Manual	W462
	SYSMAC CP Series CP1H/L CPU Unit Programming Manual	W451
	SYSMAC CP Series CP1H CPU Unit Operation Manual	W450
	SYSMAC CP Series CP1E CPU Unit Hardware USER'S Manual	W479
	SYSMAC CP Series CP1E CPU Unit Software USER'S Manual	W480
	SYSMAC C200HX/HG/HE(-E/-ZE) Installation Guide	W302
	SYSMAC C200HX/HG/HE Operation Manual	W303
	SYSMAC C200HX/HG/HE(-ZE) Operation Manual	W322
	SYSMAC CPM1A Operation Manual	W317
	SYSMAC CPM2A Operation Manual	W352
	SYSMAC CPM1/CPM1A/CPM2A/CPM2C/SRM1(-V2) Programming Manual	W353
	SYSMAC CPM2C Operation Manual	W356
	SYSMAC CS1 Series CS1G/H Operation Manual	W339
	SYSMAC CS/CJ Series Serial Communications Boards and Serial Communications Units Operation Manual	W336
	SYSMAC CJ Series CJ1G/H(-H) CJ1M CJ1G Operation Manual	W393
	SYSMAC CS/CJ Series Programming Manual	W394
	SYSMAC CS/CJ Series INSTRUCTIONS Reference Manual	W340
	SYSMAC CS/CJ Series Programming Consoles Operation Manual	W341
	SYSMAC CS/CJ Series Communications Commands Reference Manual	W342
	SYSMAC CJ Series CJ2 CPU Unit Hardware USER'S Manual	W472
	SYSMAC CJ Series CJ2 CPU Unit Software USER'S Manual	W473
	SYSMAC CS/CJ Series CS1W/CJ1W-ETN21 (100Base-TX) Ethernet Units Operation Manual Construction of Networks	W420
	SYSMAC CS/CJ Series CS1W/CJ1W-ETN21 (100Base-TX) Ethernet Units Operation Manual Construction of Applications	W421
	SYSMAC CS/CJ Series CS1W/CJ1W-EIP21 (100Base-TX) EtherNet/IP™ Units Operation Manual	W465
	SYSMAC CP Series CP1L-EL/EM CPU Unit Operation Manual	W516
	NJ Series CPU Unit Hardware USER'S Manual	W500
	NJ Series CPU Unit Software USER'S Manual	W501
	NJ Series CPU Unit Built-in EtherNet/IP™ Port USER'S Manual	W506
	NJ Series Troubleshooting Manual	W503
External Tool	CX-Programmer Ver.9.□ Operation Manual	W446
	Sysmac Studio Version 1 Operation Manual	W504

1

Part Names and Functions

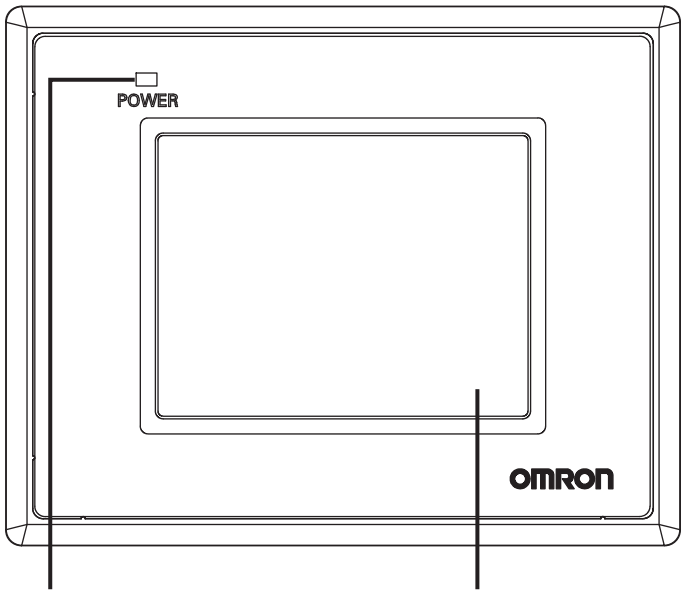
This section describes the names and functions of the various parts of an NB Unit.

1-1 Part Names **1-2**
1-2 Part Specifications **1-6**

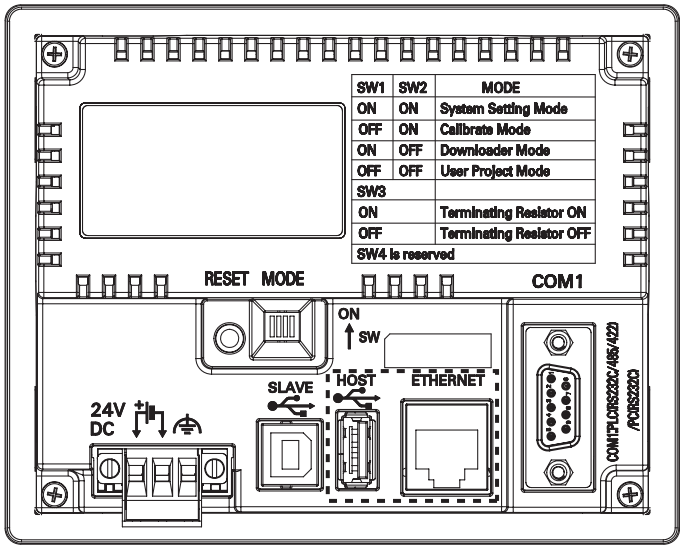
1-1 Part Names

● NB3Q-TW00B/NB3Q-TW01B model

Front view



Back view



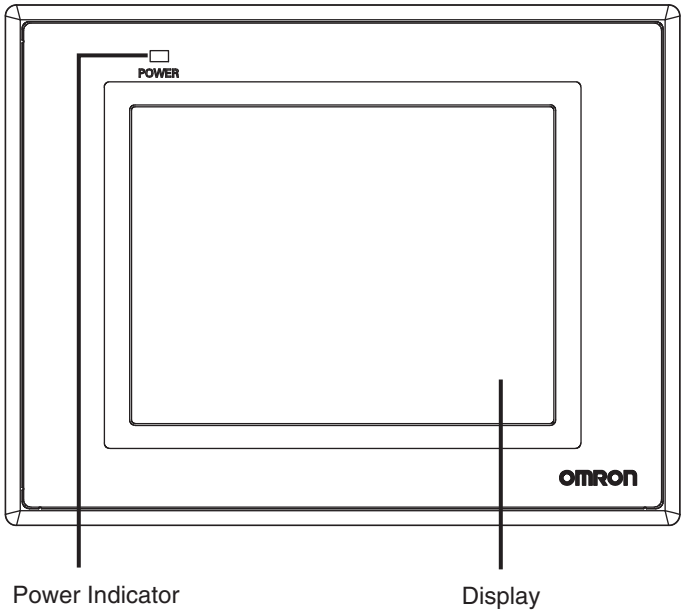
: NB□□-TW01B only

Precautions for Safe Use

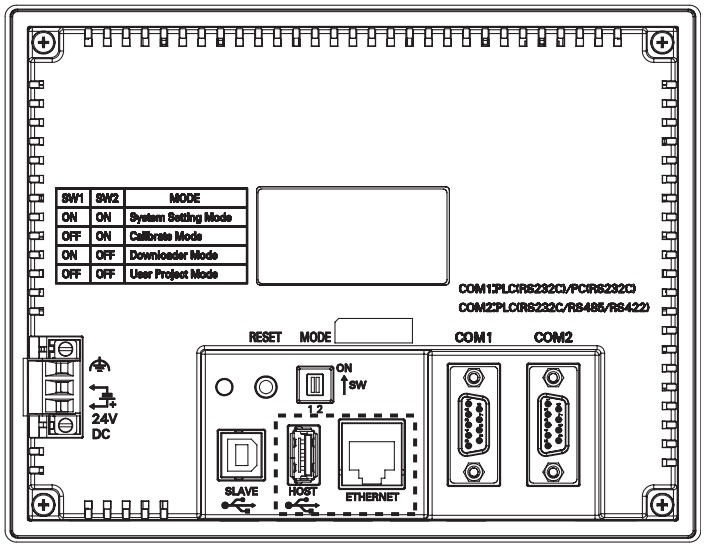
Confirm the safety of the system before turning ON or OFF the power supply, or pressing the reset button.

● NB5Q-TW00B/NB5Q-TW01B model

Front view



Back view



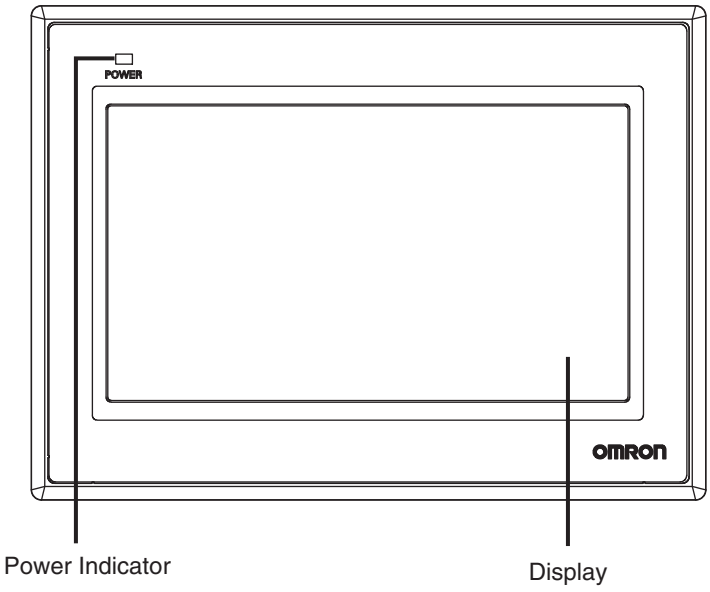
: NB□□-TW01B only

Precautions for Safe Use

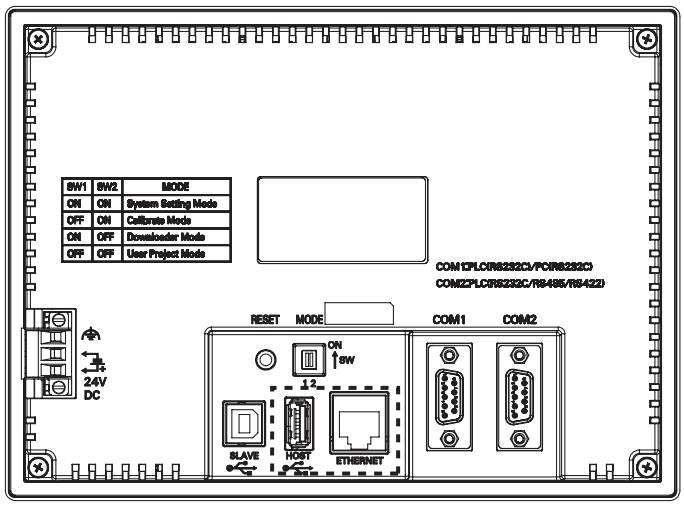
Confirm the safety of the system before turning ON or OFF the power supply, or pressing the reset button.

● NB7W-TW00B/NB7W-TW01B model

Front view



Back view



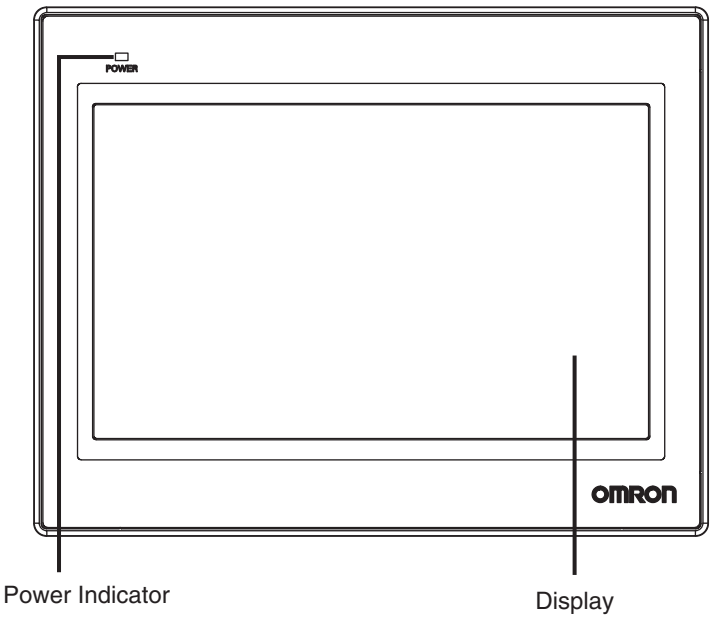
: NB□□-TW01B only

Precautions for Safe Use

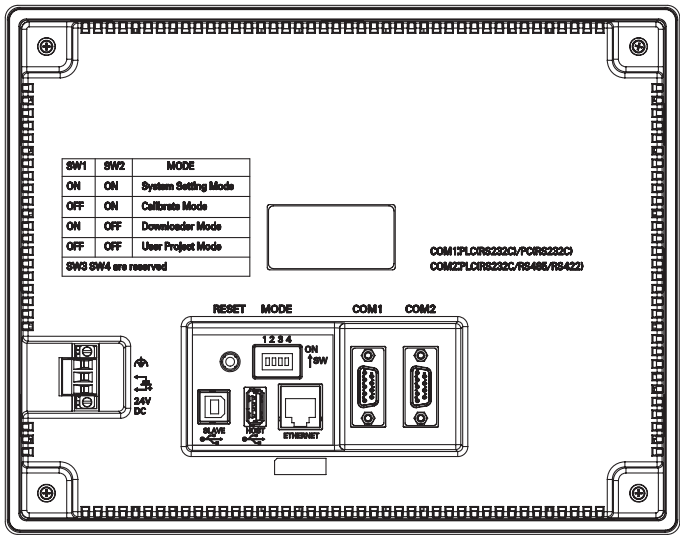
Confirm the safety of the system before turning ON or OFF the power supply, or pressing the reset button.

● NB10W-TW01B model

Front view



Back view



Precautions for Safe Use

Confirm the safety of the system before turning ON or OFF the power supply, or pressing the reset button.

1-2 Part Specifications

● Touch Panel

Input operation can be carried out by means of the touch panel. By pressing the touch panel, the screens can be switched, and the contact information can be transmitted to the host. Analog touch panel with 1024 × 1024 resolution is employed.

⚠ WARNING

Do not use the input functions of the touch switch, etc. of the NB Unit, in applications that involve human life, in applications that may result in serious injury, or for emergency stop switches.

Never press more than two points on the touch panel of the NB Unit at a time. Otherwise, it may activate a switch somewhere between the two points.

Precautions for Safe Use

- Do not press a touch switch with a force greater than 30N.
- Do not accidentally press the touch panel when the backlight is not lit or when the display does not appear. Make sure of the safety of the system before pressing the touch panel.
- Confirm the safety of the system before pressing the touch panel.
- Do not use hard or pointed objects to operate or scrub the screen, or the surface of the screen may be damaged.
- Signals from the touch switches may not be input if the switches are pressed consecutively at high speed. Confirm each input before proceeding to the next one.
- Deterioration over time can cause the touch points to move. If deviation of the touch points stands out, calibrate the touch panel periodically.

● Serial Port COM1

- NB5Q/NB7W/NB10W-TW□□B

Serial port COM1 is a 9-pin D-type socket port. This port supports RS-232C communication function, making it connectable to a controller which features RS-232C function, and it can also be used for downloading programs or debugging for the product.

The pins are defined as follows:

Pins	Signals	I/O	Functions
1	NC	-	-
2	SD	O	Sending data
3	RD	I	Receiving data
4	RS(RTS)	O	Request to send*
5	CS(CTS)	I	Clear to send*
6	DC+5V	-	DC+5V output (Max. current: 250mA)
7	NC	-	-
8	NC	-	-
9	SG	-	Signal ground

* Pins 4 and 5 are not used, thus not compliant with RS or CS functions.

Precautions for Safe Use

When using the No. 6 pin of the serial communications port COM1 connector for a voltage of DC+5V, make sure the supply equipment's current capacity is below 250 mA before using it. The DC+5V voltage output of the NB Unit is +5V±5%, and the maximum current is 250 mA.

- NB3Q-TW□□B

NB3Q-TW□□B has only 1 serial port COM1, and this port supports communication (non-isolated) based on RS-232C, RS-422 and RS-485, of which only 1 connection mode can be applied at one time. By means of the RS-232C mode (PIN 2~5), it can be connected to a controller based on RS-232C, and can also be used for downloading programs, as well as debugging for the product (connected to a PC). While with the RS-422 or the RS-485 mode (PIN 1, PIN 6~8), only a PLC can be connected.

The pins are defined as follows:

Pins	Signals	I/O	Functions		
			RS-232C	RS-485	RS-422A
1	SDB+	I/O	-	-	Sending data(+)
2	SD	O	Sending data	-	-
3	RD	I	Receiving data	-	-
4	RS(RTS)	O	Request to send*	-	-
5	CS(CTS)	I	Clear to send*	-	-
6	RDB+	I/O	-	RS485B Send/Receive data(+)	Receiving data(+)
7	SDA-	I/O	-	-	Sending data(-)
8	RDA-	I/O	-	RS485A Send/Receive data(-)	Receiving data(-)
9	SG	-	Signal ground		

* Pins 4 and 5 are not used, thus not compliant with RS or CS functions.

● Precaution for Cable Fabrication

The COM2 ports included in this manual and marked by cable manufacturers are intended for the PT of NB5Q/NB7W/NB10W-TW□□B models, therefore when communication connection is carried out with the COM1 port of NB3Q-TW□□B, please refer to the pin definitions in this section prior to connection.

● Serial Port COM2

- NB5Q/NB7W/NB10W-TW□□B

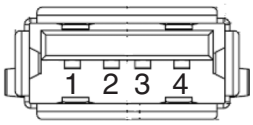
Serial port COM2 is a 9-pin D-type socket port. This port supports RS-232C/RS-485/RS-422A communication function.

The pins are defined as follows:

Pins	Signals	I/O	Functions		
			RS-232C	RS-485	RS-422A
1	SDB+	I/O	-	-	Sending data(+)
2	SD	O	Sending data	-	-
3	RD	I	Receiving data	-	-
4	Terminal R1	-	-	Terminal resistor	
5	Terminal R2	-	-	Terminal resistor	
6	RDB+	I/O	-	Send/Receive data(+)	Receiving data(+)
7	SDA-	I/O	-	-	Sending data(-)
8	RDA-	I/O	-	Send/Receive data(-)	Receiving data(-)
9	SG	-	Signal ground		

● USB HOST

NB□□-TW01B is equipped with USB HOST port, which is USB A-type port. Through this port, USB memory can be connected to perform uploading, downloading, project operation and storage of related data. And its pins are defined as follows:



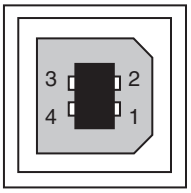
Pins	Signals	Functions
1	Vbus	USB +5V power supply output (Max. current: 150mA)
2	D-	Data -
3	D+	Data +
4	GND	USB power supply ground

Precautions for Safe Use

When you get power supply from USB host connector of the NB Unit, confirm the consumption current of connecting devices is below 150mA.
The voltage output of the NB Unit for the NB Unit is +5V±5%. The maximum current is 150mA.

● USB SLAVE

USB SLAVE port is USB B-type port, which can connect the USB port on PC side to perform the uploading, downloading and debugging of the programs for the product and the Pictbridge printing. And its pins are defined as follows:

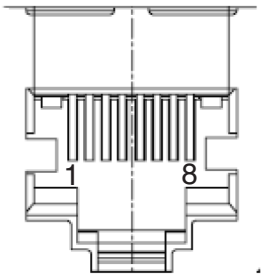


Pins	Signals	Functions
1	Vbus	USB +5V power supply output
2	D-	Data -
3	D+	Data +
4	GND	USB power supply ground

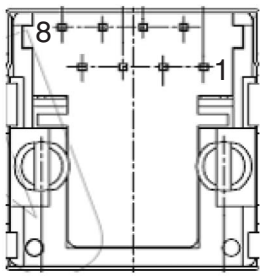
● Ethernet Interface

NB□□-TW01B is equipped with Ethernet Interface, which is adaptive RJ-45 type interface with the transmission rate of 10M/100M. It can be connected with PC to perform the uploading and downloading of the programs and the system initialization, and can also be used to realize the communication with the controller supporting the Ethernet communication. And its pins are defined as follows:

TOP



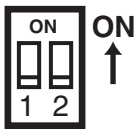
Bottom



Pins	Signals	Functions
1	TD+	Sending data +
2	TD-	Sending data -
3	RD+	Receiving data +
4	---	Not used
5	---	Not used
6	RD-	Receiving data -
7	---	Not used
8	---	Not used

● DIP Switch

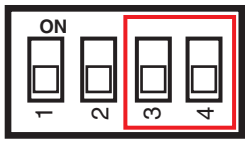
NB5Q/NB7W only has 2 switches SW1 and SW2, while for the NB3Q and NB10W, there are totally 4 DIP switches, and for all models, SW1 and SW2 feature the same functions. The settings and corresponding operating modes are as follows:



SW1	SW2	Operating modes
ON	ON	System Setting Mode
OFF	ON	Calibrate Mode
ON	OFF	Downloader Mode
OFF	OFF	User Project Mode

- System Setting Mode: The PT will be launched into a built-in system setup screen, and is subject to the user for the settings of brightness, system time, buzzer and Pictbridge printing function.
- Calibrate Mode: When the user touches the panel, a symbol “+” will pop up on the screen, with which the touch control precision level can be calibrated.
- Downloader Mode: This is used for updating Kernel and root file system.
- User Project Mode: This is used to display the downloaded user projects.

As mentioned above, the settings and corresponding operating modes of the switches SW1 and SW2 of NB3Q and NB10W are the same as those of NB5Q/NB7W (see the table above), and the functions of SW3 and SW4 of NB3Q and NB10W are stated as below:



Switch No. (corresponding model(s))	Status	Descriptions of Function
SW3 (NB3Q)	ON	Terminal resistance ON
	OFF	Terminal resistance OFF
SW3 (NB10W)	Reserved	
SW4 (NB3Q/NB10W)	Reserved	

● Reset Switch

When pressing the reset switch located on the back side of the PT, the system will be rebooted.

2

Installing the NB Unit and Connecting Peripheral Devices

This section describes the methods used to install the NB Unit and connect peripheral devices.

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- 2-1-2 Installation onto the Operation Panel 2-3
- 2-1-3 Connecting the Power Supply 2-5
- 2-1-4 Grounding Wiring 2-6

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2-1 Installing the NB Unit

This section describes the methods used to mount the NB Unit onto an operation panel and connect the power supply.

2-1-1 Installation environment

When mounting the NB Unit onto the operation panel, pay attention to the following precautions.

⚠ WARNING

Always ensure that the personnel in charge confirm that installation, inspection, and maintenance were properly performed for the NB Unit.

“Personnel in charge” refers to individuals qualified and responsible for ensuring safety during machine design, installation, operation, maintenance, and disposal.

Ensure that installation and post-installation checks are performed by personnel in charge who possess a thorough understanding of the machinery to be installed.

Precautions for Correct Use

- Do not install the product in any of the following locations:
  Locations subject to rapid changes in temperature
  Locations subject to temperatures or humidity outside the range specified in the specifications
  Locations subject to condensation as the result of high humidity
  Locations subject to corrosive or flammable gases
  Locations subject to strong shock or vibration
  Locations outdoors subject to direct wind and rain
  Locations subject to strong ultraviolet light
  Locations subject to dust
  Locations subject to direct sunlight
  Locations subject to splashing oil or chemicals
- Take appropriate and sufficient countermeasures when the product is used in the following locations:
  Locations subject to static electricity or other forms of noise
  Locations subject to strong electric field or magnetic field
  Locations close to power supply lines
  Locations subject to possible exposure to radioactivity

Precautions for Safe Use

When unpacking the NB Units and the peripheral devices, check carefully for any external scratches or other damage. Also, shake the Units gently and check for any abnormal sound.

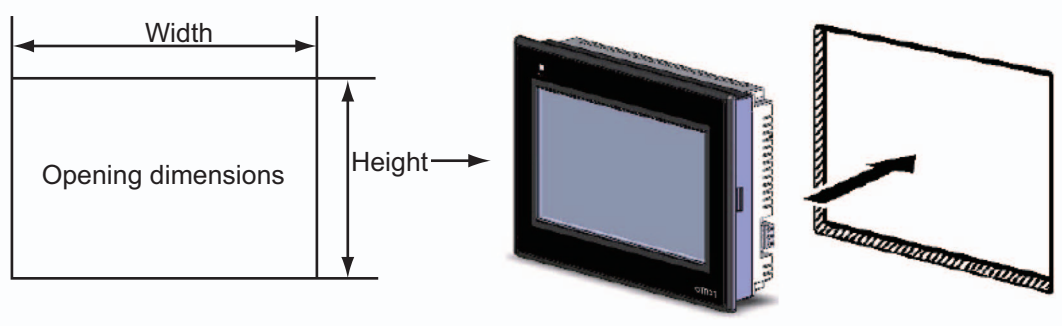
2-1-2 Installation onto the Operation Panel

Install the NB Unit by embedding it into the operation panel.

Use the panel mounting brackets and Phillips screwdriver for installation.

Proceed the installation following the procedures below.

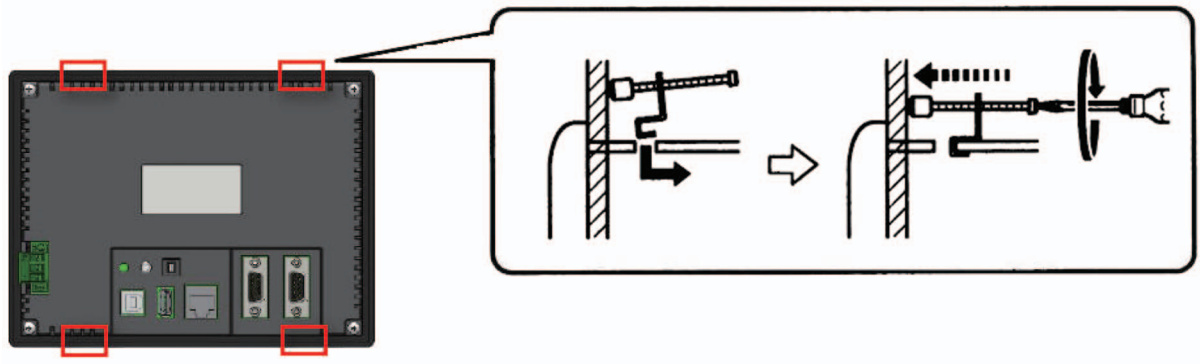
1 Panel cutout with dimensions is shown below. Fit the NB Unit into the panel from the front side.



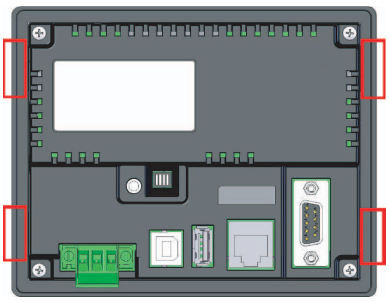
Models	Opening Dimension (W×H mm)
NB3Q-TW00B/TW01B	119.0(+0.5/-0)×93.0(+0.5/-0)
NB5Q-TW00B/TW01B	172.4(+0.5/-0)×131.0(+0.5/-0)
NB7W-TW00B/TW01B	191.0(+0.5/-0)×137.0(+0.5/-0)
NB10W-TW01B	258.0(+0.5/-0)×200.0(+0.5/-0)

2 As follows, insert the panel mounting brackets at the locations indicated by red box around the back of the NB Unit. Insert the hooks of positioners into the square holes on the Unit to hold the fixators properly, and tighten the screws firmly with the screwdriver.

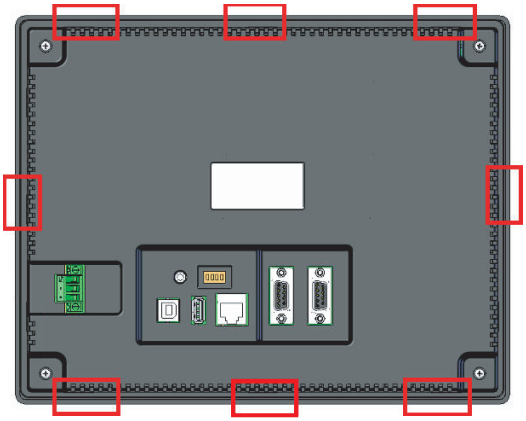
- **NB5Q/NB7W-TW□□B**



● The insert positions on the body of NB3Q-TW□□B/NB10W-TW01B (same fixing method as above)



NB3Q -TW□□B



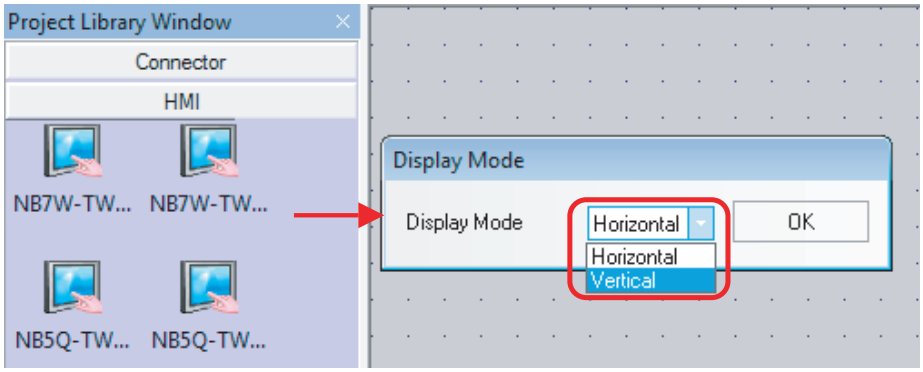
NB10W -TW□□B

Precautions for Safe Use

- Do not let metal particles enter the Units when preparing the panel.
- The mounting panel must be between 1.6 and 4.8 mm thick. Tighten the Mounting Brackets evenly to a torque of between 0.5 and 0.6 N·m to maintain water and dust resistance. If the tightening torque exceeds the specified value, or the tightening is not even, deformation of the front panel may occur. What is more, make sure the panel is not dirty or warped and that it is strong enough to hold the Units.

● Display Mode of NB Series touch panel

NB Series touch panel has 2 display modes: horizontal and vertical.
The display mode can be selected when dragging a PT from Project Library Window into Configuration and Setup Window.



Horizontal display

Vertical display

2-1-3 Connecting the Power Supply

Precautions for Safe Use

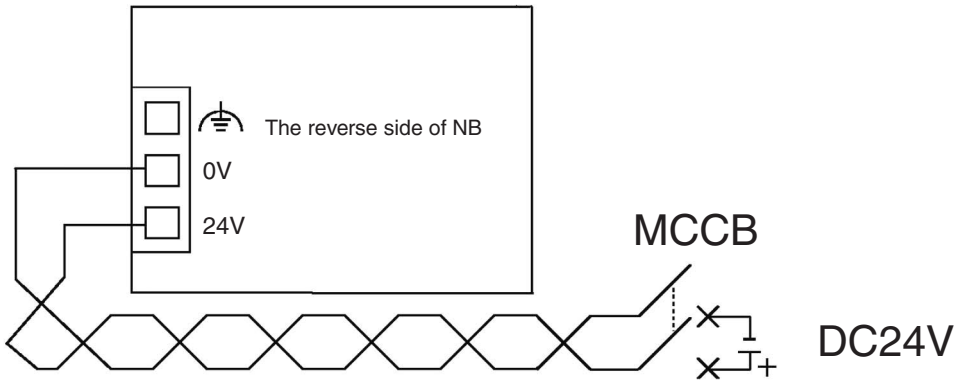
- Do not connect an AC power supply to the DC power terminals.
- Use a DC power with a slight voltage fluctuation and reinforced or double insulation, and that will provide a stable output even if the input is momentarily interrupted for 10 ms. Rated Power Supply Voltage: DC 24 V (Allowable range DC 20.4 ~ 27.6 V)

● Power Supply

The connectable power supply specifications are as follows: figure out a suitable power supply specification so as to satisfy the requirement for power supply capacity.

Models	Rated Voltage	Allowable Voltage Range	Power
NB3Q-TW00B	DC24V	DC20.4V to 27.6V	5W
NB3Q-TW01B			9W
NB5Q-TW00B			6W
NB5Q-TW01B			10W
NB7W-TW00B			7W
NB7W-TW01B			11W
NB10W-TW01B			14W

● NB5Q/NB7W/NB10W-TW□□B



● NB3Q -TW□□B

Precautions for Safe Use

- Before connecting the power supply to the NB unit, mount the cable on the terminal block. Make the connection by using terminal screws crimping on a twisted-pair cable with a crimping range of 12~26 AWG, and only 6.5 mm of insulation peel of the cable needs to be peeled off. Tighten the terminal screws at a torque of between 0.3 and 0.5 N·m. Make sure the screws are properly tightened. Only NB3Q-TW□□B has a different pin arrangement of the terminal block. Do not make use of the terminal block of NB3Q-TW□□B for other equipments.

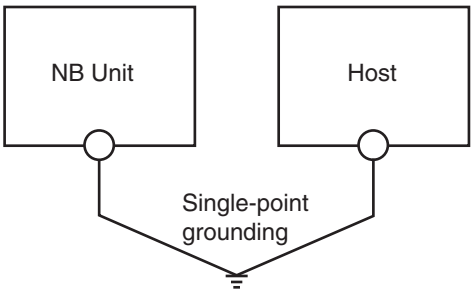
2-1-4 Grounding Wiring

The NB Unit has a functional grounding terminal ( ).

Arrange the wiring according to the following conditions.

1 When a potential difference occurs between the NB Unit and the host, arrange the grounding as illustrated. If the distance is too long to realize a single-point grounding, do not ground the of the NB Unit.

2 When the NB Unit, and noise source equipment such as motors and inverters, etc. are installed on the same panel, do not ground the of the NB Unit.



Precautions for Safe Use

To prevent malfunctions caused by noise, ground the Unit correctly.

2-2 Start of NB Series

Confirm the hardware are all correctly connected, turn on the power supply, and start the NB-Series.

This part describes the operations of the NB Series when it starts.

● When starting the NB Unit for the first time

(1) Confirm that the DIP switches SW1 and SW2 on the back side are both ON.

(2) Turn on the power supply of the NB Unit, and with the POWER LED on the front side turning green, the NB Unit starts, entering into the System Setting Mode.

(3) Through the System Setup screen, the system time, starting window No., screen saving time, buzzer and the screen brightness can be set. When the setup is finished, turn OFF the power supply, turn OFF both of the DIP switches, SW1 and SW2, and then switch on the power supply again.

● When starting the NB Unit after downloading the screen data to it.

(1) Confirm that the DIP switches SW1 and SW2 on the back side are both OFF.

(2) Turn on the power supply of the NB Unit, and with the POWER LED on the front side turning green, the NB Unit starts.

(3) The starting screen of the screen data downloaded to the NB Unit will be shown.

● Entering into Calibrate Mode

(1) Confirm that the DIP switches SW1 and SW2 on the back side are respectively OFF and ON.

(2) Turn on the power supply of the NB Unit, and with the POWER LED on the front side turning green, the NB Unit starts.

(3) When the user touches the panel, a symbol “+” will pop up on the screen, with which the touch control precision level can be calibrated.

Precautions for Safe Use

Confirm the safety of the system before turning ON or OFF the power supply, or pressing the reset button.

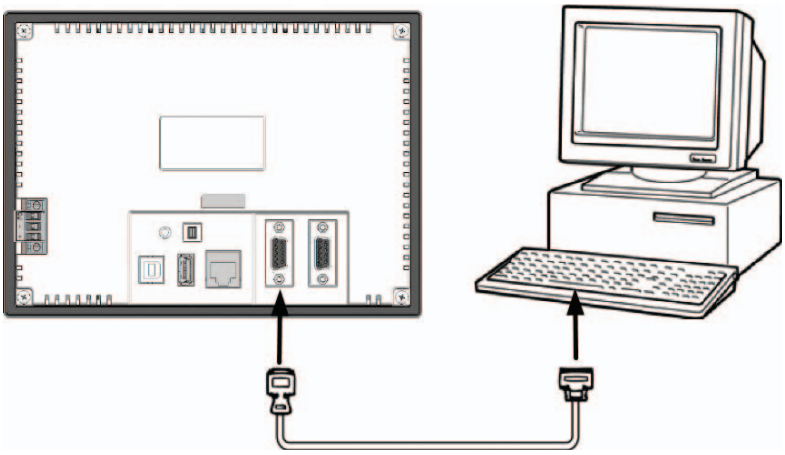
2-3 Connecting of NB-series with PC

In order to transmit the screen data established by the NB-Designer to the NB Unit, the NB Unit needs to be connected to a PC with a RS-232C, USB or Ethernet cable.

2-3-1 Connecting by RS-232C

Take NB5Q/NB7W-TW01B as example:

Connect the RS-232C cable at the PC side to the serial port COM1 of the NB Unit.



● Communication conditions

Select the downloader mode through the tool menu of the NB-Designer. For details, refer to *3-15 Download* in the *NB-Designer Operation Manual*.

● Communication cable

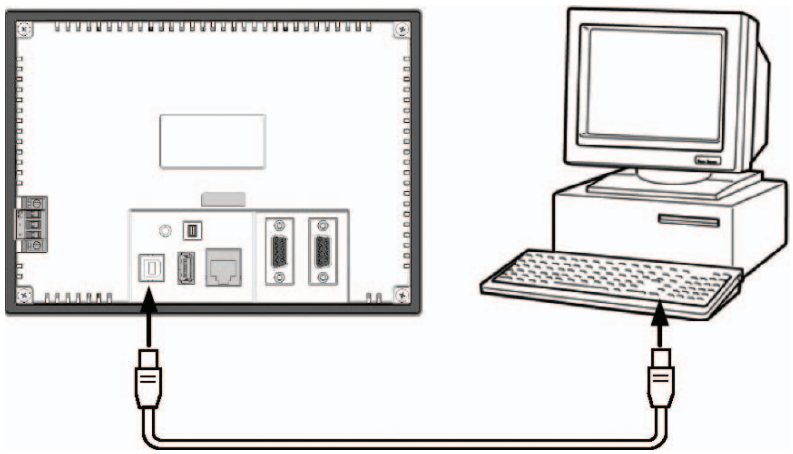
Users can make connection cables by themselves. For details, refer to *A-4 Fabrication of the Connection Cable* in the *NB Series Setup Manual*.

2-3-2 Connecting by USB

Use the USB transmission cable to connect the USB A-type port on PC side with the USB SLAVE B-type port on NB Unit. As to the USB connection, there are some preparations and restrictions that need to be done or heeded. Refer to the following content to ensure a correct connection.

Take NB5Q/NB7W-TW01B as example:

Connect the USB port at the PC side and the USB slave connector of the NB Unit.



● USB driver for the NB-Designer

A USB driver needs to be installed in the PC for the purpose of transmitting screen data through USB.

The USB driver should be installed at the first time when connecting the NB Unit to a PC.

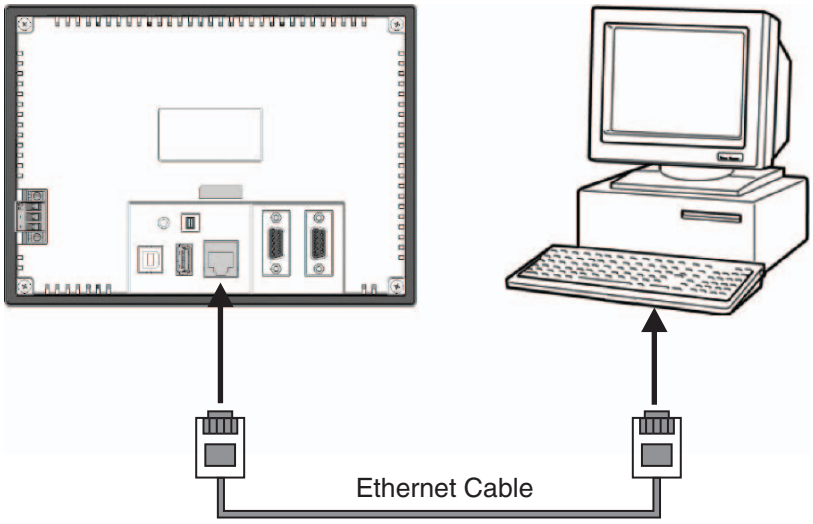
Please refer to *2-4 Installation of USB-Driver for NB* in the *NB-Designer Operation Manual* for details on the USB driver.

Precautions for Safe Use

- Commercially available and the recommended USB HUBs are different from the general specifications of the NB Unit. The Unit may not function well in an environment subject to noise, static electricity. Therefore, when using a USB HUB, employ sufficient noise and static electricity insulation measures, or install it at a site free of noise or static electricity.
- Do not connect a USB connector to any device that is not applicable.
- Before connecting a USB connector to a device, make sure that the device is free of damage.

2-3-3 Connecting by Ethernet

PT with model number of NB□□-TW01B (other than NB□□-TW00B) can perform the uploading & downloading of data (such as user project and recipe etc.) and the refreshing of PT firmware through connecting the Ethernet cable with RJ45 connectors on both ends and the network interface on PC side.



● Communication conditions

Select the corresponding download method by clicking the Download Way option in Tools menu of the NB-Designer. For details, refer to *3-15 Download* in the *NB-Designer Operation Manual*.

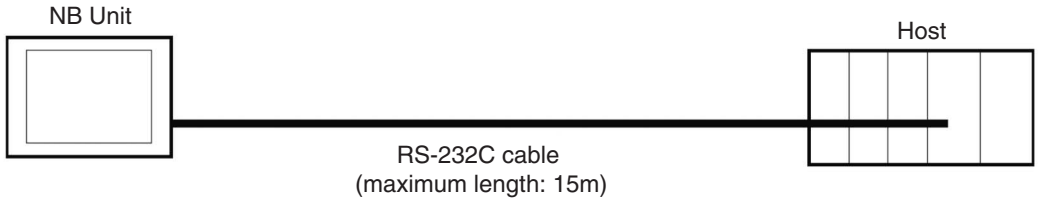
2-4 Serial Communication Connection

2-4-1 Host Link Connection Method

Host Link is a connection method in which one PLC is connected to one NB Unit. There are 2 kinds of connection methods: RS-232C and RS-422A.

● The RS-232C connection method using serial ports COM1/COM2

This is the simplest and most feasible method.



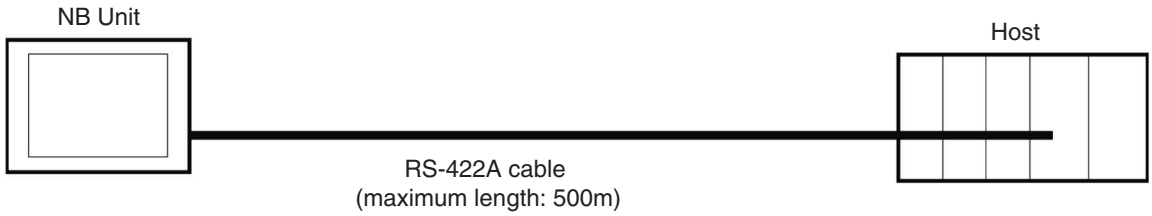
The following cables are recommended.

XW2Z-200T (Cable length: 2m) by OMRON

XW2Z-500T (Cable length: 5m) by OMRON

● The RS-422A connection method using the serial port COM2

With this method, the communication distance can be extended to a maximum of 500m.



The following cables are recommended.

NB-RSEXT-2M (Cable length: 2m) by OMRON

Note please adopt 4-wire RS-422A connection, and Host Link does not support 2-wire RS-485 connection.

● Connectable Units at the host side

When using OMRON PLCs, the Units with built-in Host Link function vary depending on models and series. There is also the CPU Unit connected in a Host Link method through adding the serial communication board or communication board.

When connecting, confirm the connected PLC's series, model and the models of the installed circuit board/Unit.

As to the Units at the host side which can be connected to NB series Unit by RS-232C or RS-422A through a Host Link, refer to *A-5 List of Models* in the *NB Series Setup Manual*.

● Communication setting

The communication settings need to be set as following values before carrying out communications in the Use Host link.

Items	Settings
Data bit	7bit
Stop bit	2bit
Parity check	Even
Communication speed	Any value, but the values for the NB Unit and the host must be the same.
Station No.	00

Settings at the NB Unit should be specified from the [Configuration and Setup Window] in NB-Designer. For details, refer to *3-10-8 COM1/COM2 Setting* in the *NB-Designer Operation Manual*.

For communication settings at the host side, refer to the related PLC manuals as needed.

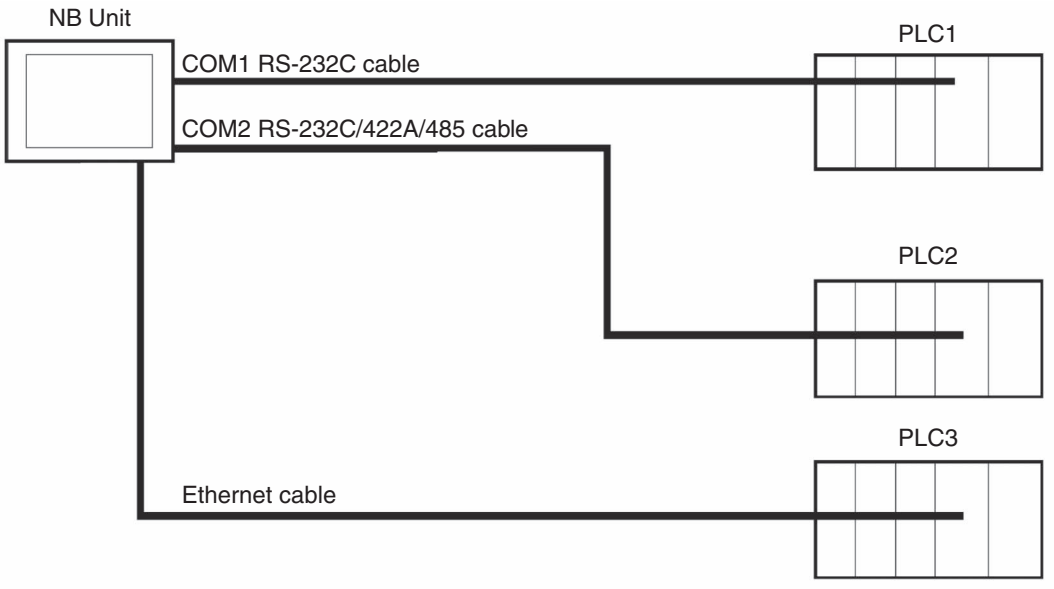
2-4-2 Connecting more than one PLC

Select the RS-232C method for COM1, and one from RS-232C, RS-422A and RS-485 for COM2 (NB3Q-TW□□B is not equipped with serial port COM2.).

PT with the model number of NB□□-TW01B, which supports Ethernet, can connect single PLC or multiple PLCs simultaneously through the Ethernet (through the router). When connecting with multiple PLCs, it can connect the Host manufactured by the same manufacture or different manufactures simultaneously.

Note Multiple Communications systems cannot be used simultaneously by the same COM port.

The example of NB5Q/NB7W/NB10W-TW01B connecting with 3 PLCs simultaneously is as shown below:



Precautions for Safe Use

- Always keep the connector screws firmly tightened after the communication cable is connected.
- The maximum tensile load for cables is 30N. Do not apply loads greater than this.
- The communication cables of the COM1 and COM2 connectors are not interchangeable. Confirm the pins of the ports before carrying out communications.(NB3Q-TW00B and NB3Q-TW01B only have COM1.)

2-4-3 Settings for each Unit

When connecting with the serial communication ports, the settings for each Unit are as follows:

When connecting to CP-Series CPU Units

CP1L-L14/L20/M30/M40/M60 models
CP1H-X40/XA40/Y20 models
CP1E-N14/N20 models
CP1E-N30/N40/N60/NA20 models
CP1L-EL20/EM30/EM40 models

● PLC System Settings Area

Write settings directly into the [PLC System Settings Area] with a peripheral tool (CX-Programmer, etc.) based on the model and port of the host.

Host model and Port No.	Channel No. (*1)	Write Value	Setting
CP1L-M30/M40/M60, serial port 1 CP1H-X40/XA40/Y20, serial port 1 CP1L-EM30/EM40, serial port 1	144	8000	Use Host Link
	145	0000~000A(*2)	Communication speed
	147	0000~001F	Unit number
CP1L-L14/L20, serial port 1 CP1L-M30/M40/M60, serial port 2 CP1H-X40/XA40/Y20, serial port 2 CP1L-EL20, serial port 1 CP1L-EM30/EM40, serial port 2	160	8000	Use Host Link
	161	0000~000A(*2)	Communication speed
	163	0000~001F	Unit number

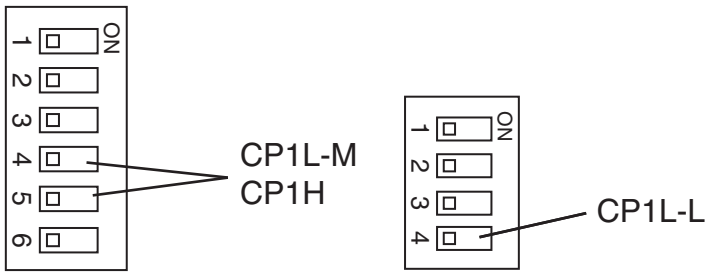
Host model and Port No.	Channel No.	Write Value	Setting
CP1E-N14/N20, serial port 1 CP1E-N30/N40/N60/NA20, serial port 1	A617.15~12	0	Use Host Link
	A617.11~08	0, 3~A(*2)	Communication speed
	A617.07~00	00	7 data bits, 2 stop bits, Even
CP1E-N30/N40/N60/NA20, serial port 2	A618.15~12	0	Use Host Link
	A618.11~08	0, 3~A(*2)	Communication speed
	A618.07~00	00	7 data bits, 2 stop bits, Even

*1 The channel No. of CP1L/H is PLC Setup area.

*2 The communication speed should be set to the same value as that of the NB Unit.

● Settings for the front-side DIP Switches

Set the front-side DIP switches so as to validate the settings for [PLC System Settings Area].
Set the SW4 to OFF when serial port 1 is used, set SW5 to OFF when serial port 2 is used. As the CP1L-L has only one serial port, it has no DIP switch SW5.



When connecting to C-Series CPU Units

C200HX/HG/HE(-Z), CPM1□, CPM2□, CQM1H type CPU Units

● Connection Methods

The connection methods for the CPU Units of different PLC models.

PLC Models	RS-232C connection	RS-422A connection
C200HX/HG/HE(-Z)	• Connect to the RS-232C port built in the CPU Unit • Connect to the RS-232C port (Ports A, B) of the serial communication board	• Connect to the RS-422A port (port A) of the serial communication board
CPM1A	• Connect to the peripheral port with a dedicated RS-232C adaptor (CPM1-CIF01).	• Connect to the peripheral port with a dedicated RS-422A adaptor (CPM1-CIF11 type).
CPM2A	• Connect to the RS-232C port built in the CPU Unit • Connect to the peripheral port with a dedicated RS-232C adaptor (CPM1-CIF01).	• Connect to the peripheral port with a dedicated RS-422A adaptor (CPM1-CIF11 type).
CPM2C	• Connect to the RS-232C port built in the CPU Unit or the peripheral port with a dedicated conversion cable (CPM2C-CN111 type, CS1W-CN118 type and CS1W-CN114 type) (CPM2C-CN111 type is a cable that divides the Unit port into the RS-232C port built in the CPU Unit and the peripheral port. When connecting to the peripheral port, a RS-232C adaptor (CPM1-CIF01 type) is also needed to be connected.)	• Connect to the peripheral port with a dedicated conversion cable (CPM2C-CN111 type or CS1W-CN114 type) and a RS-422A adaptor (CPM1-CIF11 type) (CPM2C-CN111 type is a cable that divides the Unit port into the RS-232C port built in the CPU Unit and the peripheral port).
CQM1H	• Connect to the RS-232C port built in the CPU Unit • Connect to the peripheral port with a conversion cable (CS1W-CN118 type) Connect to the RS-232C port (Port 1) of the serial communication board	• Connect to the RS-422A port (Port 2) of the serial communication board

● PLC System Settings Area

Write settings directly into the [PLC System Settings Area] (Data memory) with a peripheral tool (CX-Programmer, etc.) based on the model and port of the host.

For RS-232C

Host Model	Channel No.	Write Value	Setting
The RS-232C port built in C200HX/HG/HE(-Z), CPM2A, CPM2C, CQM1H	DM6645	0001	Use Host Link
	DM6646	03□□(*3)	Communication conditions are standard settings. (*4)
	DM6648	0000	Unit No. 00
CPM1A	DM6650	0001	Use Host Link
	DM6651	03□□(*3)	Communication conditions are standard settings. (*4)
	DM6653	0000	Unit No. 00
Port A of C200HX/HG/HE(-Z) (*1) Port 1 of CQM1H (*2)	DM6555	0001	Use Host Link
	DM6556	03□□(*3)	Communication conditions are standard settings. (*4)
	DM6558	0000	Unit No. 00
Port B of C200HX/HG/HE(-Z) (*1)	DM6550	0001	Use Host Link
	DM6551	03□□(*3)	Communication conditions are standard settings. (*4)
	DM6553	0000	Unit No. 00

*1 The RS-232C port of the Communication Board.

*2 The RS-232C port of the Serial Communication Board.

*3 □□ is the set value of the communication speed. Set the communication speed to the same value as that of the NB Unit.

*4 Standard settings of the Communication conditions are as follows:
Start bit: 1 bit, Data bit: 7 bit, Stop bit: 2 bit, parity check: even

For RS-422A

Host Model	Channel No.	Write Value	Setting
Port A of C200HX/HG/HE (-Z) (*1)	DM6555	0001	Use Host Link
	DM6556	03□□(*3)	Communication conditions are standard settings. (*4)
	DM6558	0000	Unit No. 00
Port 2 of CQM1H (*2)	DM6550	0001	Use Host Link
	DM6551	03□□(*3)	Communication conditions are standard settings. (*4)
	DM6553	0000	Unit No. 00

*1 The RS-422A port of the Communication Board

*2 The RS-422A port of the Serial Communication Board

*3 □□ is the set value of the communication speed. Set the communication speed to the same value as that of the NB Unit.

*4 Standard settings of the Communication conditions are as follows:
Start bit: 1 bit, Data bit: 7 bit, Stop bit: 2 bit, parity check: even

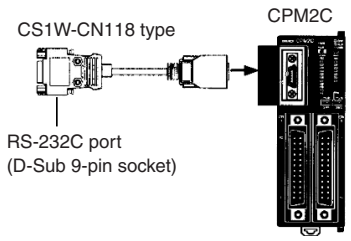
For operations on [PLC System Settings Area], refer to the manual of the PLC employed.

● Connection methods for CPM2C

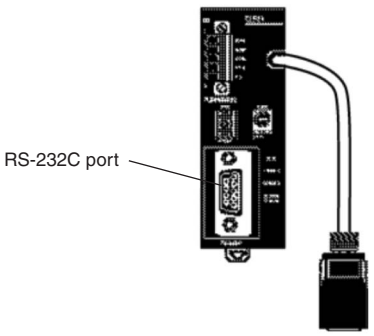
CPM2C only has a connector with the same shape of the CS-Series' peripheral port, but the signal cables inside are classified as used for the RS-232C port built in the CPU Unit and for the peripheral port. Therefore, when using CPM2C, differentiate between the settings for the RS-232C port built in the CPU and for the peripheral port based on the conversion cable and port employed to ensure correct use. Besides, when using a simple communication device (CPM2C-CIF21 type), connect to the RS-232C port. For details, refer to the *CPM2C Operation Manual* (W356).

Use a self-made connection cable to connect the NB Unit and CPM2C. Connect to CPM2C's built-in RS-232C port instead of the peripheral port.

Port connected to the PT	PLC System Settings
CS1W-CN118 type port(D-Sub 9-pin)	Carry out settings for the built-in RS-232C port



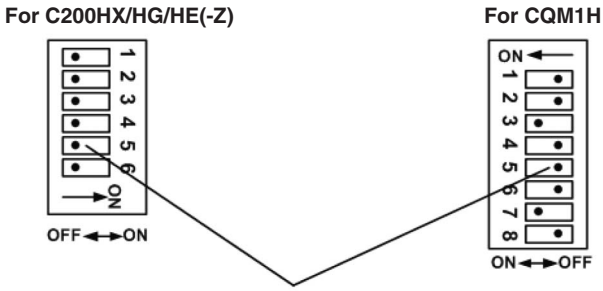
When using a simple communication device (CPM2C-CIF21 type), connect to the RS-232C port directly.



● Settings for the front-side DIP Switches

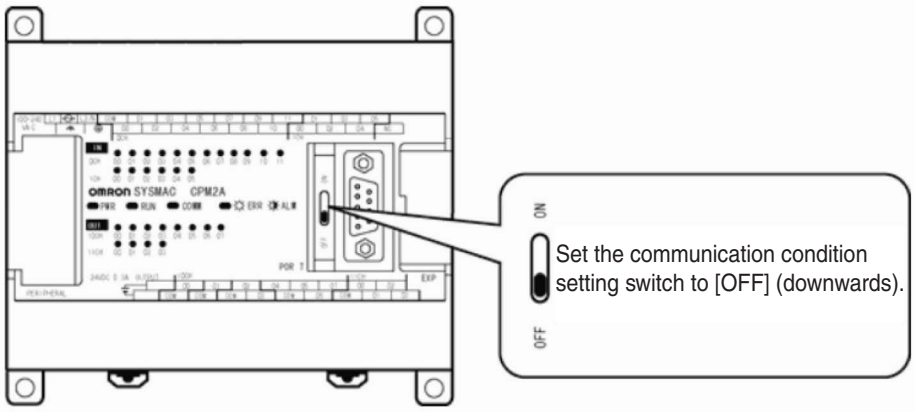
To activate the settings of [PLC System Settings Area] (Data memory), set as follows according to the PLC:

- For C200HX/HG/HE (-Z) and RS-232C of CQM1H

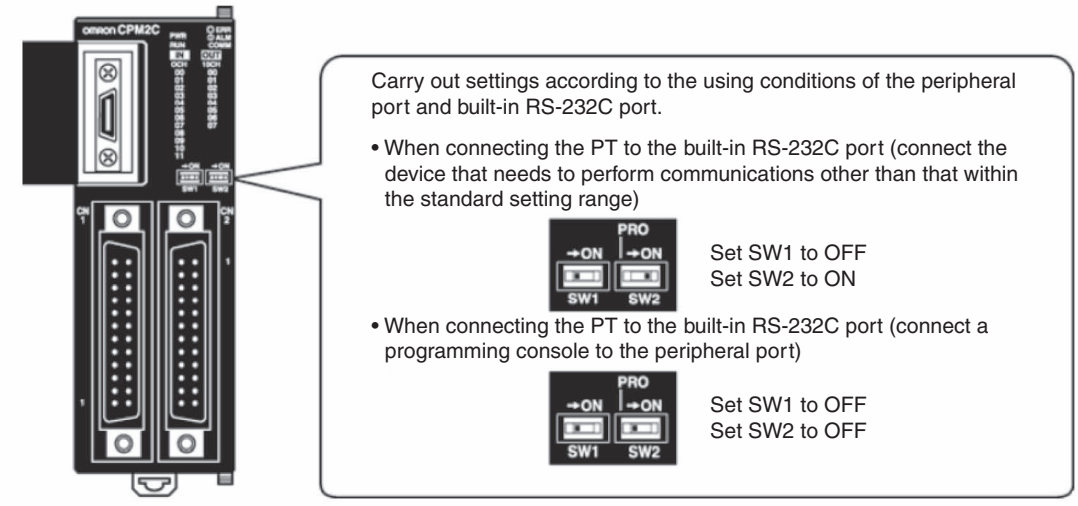


Communication condition setting for the RS-232C port
Set the DIP switch 5 to OF, and activate the "settings" in PLC system settings.

- For CPM2A



- For CPM2C (Only the RS-232C port can be connected)


omron CPM2C
Carry out settings according to the using conditions of the peripheral port and built-in RS-232C port.
• When connecting the PT to the built-in RS-232C port (connect the device that needs to perform communications other than that within the standard setting range)
PRO
→ON
SW1
SW2
Set SW1 to OFF
Set SW2 to ON
• When connecting the PT to the built-in RS-232C port (connect a programming console to the peripheral port)
PRO
→ON
SW1
SW2
Set SW1 to OFF
Set SW2 to OFF

● Setting methods for communication board switches (For RS-422A)

- For C200HX/HG/HE (-Z)

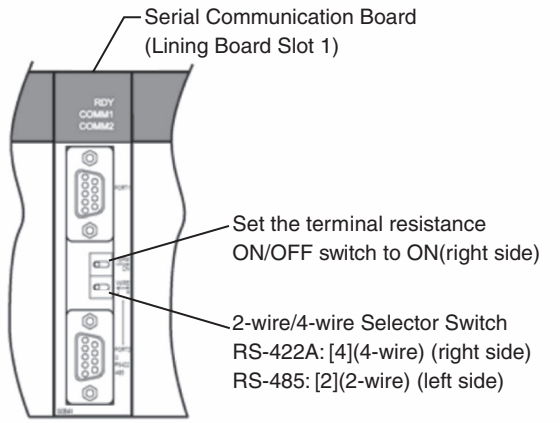
Switch 1: [4] Side (4-wire = RS-422A)

Switch 2: ON side (terminal resistance ON = Terminal resistance activated)

- For CQM1H

2-wire/4-wire switch (WIRE): [4] side (4 wire = RS-422A)

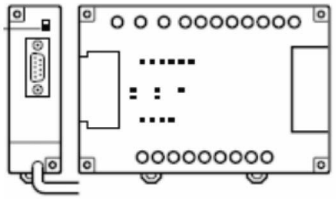
Terminal resistance ON/OFF switch (TERM): ON side (terminal resistance ON = Terminal resistance activated)



● Settings for the communication adaptor switch

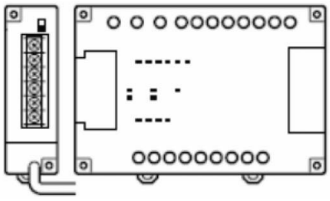
- For RS-232C adaptor (CPM1-CIF01 type)

Set the mode setting switch to [HOST] (Up side).



- For RS-422A adaptor (CPM1-CIF11 type)

Set the terminal resistance switch to ON (Up side)



When connecting to CS-Series CPU Units

For CS1G/H-CPU□□ (-V1) types and CS1G/H-CPU□□H types

● Connection Methods

Connect to the RS-232C port built in the CPU Unit or the RS-232C port of the communication board. When connecting to the peripheral port, a connection cable dedicated for the peripheral port is needed (CS1W-CN118 type).

Only RS-232C can be used for connection.

● PLC System Settings Area

When connecting to CS-Series CPU Unit, refer to the following table and set the communication conditions as follows in [PLC System Settings] based on the communication port in use.

Connection Methods	Channel No.	Write Value	Setting
Use the RS-232C port built in CS1G/H, CS1G/H-H	160	8000	Use Host Link
	161	0000~000A(*1)	Communication speed
	163	0000	Unit No. 00
Use the peripheral port of CS1G/H, CS1G/H-H	144	8000	Use Host Link
	145	0000~000A(*1)	Communication speed
	147	0000	Unit No. 00

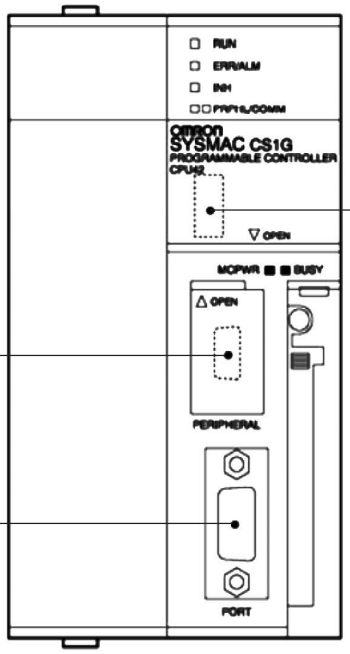
*1 The communication speed should be set to the same value as that of the NB Unit.

[PLC System Settings] can be directly set with a peripheral tool (programming console), or it can be set by transmitting the [PLC System Settings] set up by a peripheral tool (CX-Programmer) to the CPU Unit.

For details about the [PLC System Settings], refer to *SYSMAC CS Series Operation Manual* (W339).

● Settings for the front-side Switches

Set the DIP switches 4 or 5 as follows according to the NB-Series' port connected.



DIP Switch (in the battery jar)
- When connecting a NB-Series Unit to a peripheral port, set SW4 to [ON] (communications carried out according to the PLC system settings).
- When connecting a NB-Series Unit to a RS-232C port, set SW5 to [OFF] (communications carried out according to the PLC system settings).

Peripheral Port
Mainly used for connecting peripheral tools, ect. (also used for connecting RS-232C devices)

RS-232C Port
Mainly used for connecting RS-232C devices (also used for connecting CX-Programmer)

When connecting to CJ Series CPU Units

For CJ1G-CPU□□ type, CJ1G/H-CPU□□H types and CJ1M-CPU□□ type

● Connection Methods

Connect to the RS-232C port built in the CPU Unit or the RS-232C port of the communication board. When connecting to the peripheral port, a connection cable dedicated for the peripheral port is needed (CS1W-CN118 type). Only RS-232C can be used for connection.

● PLC System Settings Area (for RS-232C)

When connecting to the CJ-Series CPU Unit, refer to the following table and set the communication conditions as follows in [PLC System Settings] based on the communication port in use.

Connection Methods	Channel No.	Write Value	Setting
Use the RS-232C port built in CJ1G-CPU□□ type, CJ1G/H-CPU□□H types, CJ1M-CPU□□ types	160	8000	Use Host Link
	161	0000~000A(*1)	Communication speed
	163	0000	Unit No. 00
Use the peripheral port of CJ1G-CPU□□ type, CJ1G/H-CPU□□H types, CJ1M-CPU□□ type	144	8000	Use Host Link
	145	0000~000A(*1)	Communication speed
	147	0000	Unit No. 00

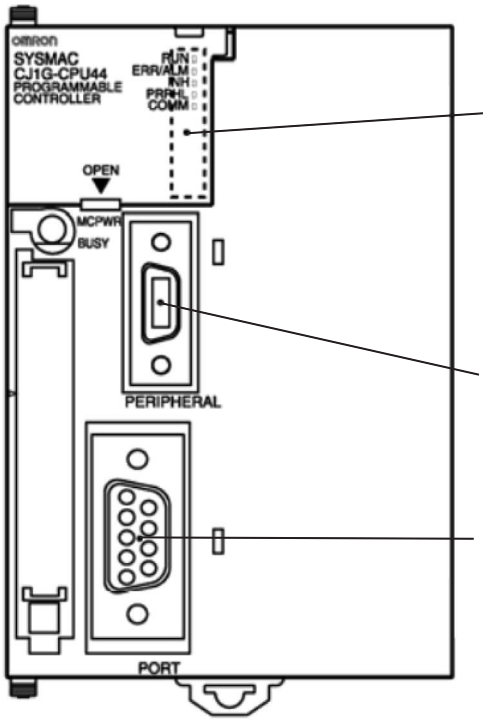
*1 The communication speed should be set to the same value as that of the NB Unit.

[PLC System Settings] can be directly set with a peripheral tool (Programming console), or it can be set by transmitting the [PLC System Settings] set up by a peripheral tool (CX-Programmer) to the CPU Unit.

For details about the [PLC System Settings], refer to *SYSMAC CJ Series Operation Manual* (W393).

● Settings for the front-side Switches

Set the DIP switches 4 or 5 as follows according to the NB-Series' port connected.



DIP Switch(in the battery jar)
- When connecting a NB-Series Unit to a peripheral port, set SW4 to [ON] (communications carried out according to the PLC system settings).
- When connecting a NB-Series Unit to a RS-232C port, set SW5 to [OFF] (communications carried out according to the PLC system settings).

Peripheral Port
Used for connecting programming consoles, ect.

RS-232C Port
Used for connecting devices other than programming consoles.

When connecting to CJ2-Series CPU Units

For CJ2M-CPU3□ type, CJ2M-CPU1□ type and CJ2H-CPU6□(-EIP) type

● Connection Methods

Connect to the RS-232C port built in the CPU Unit or the RS-232C port of the communication board.

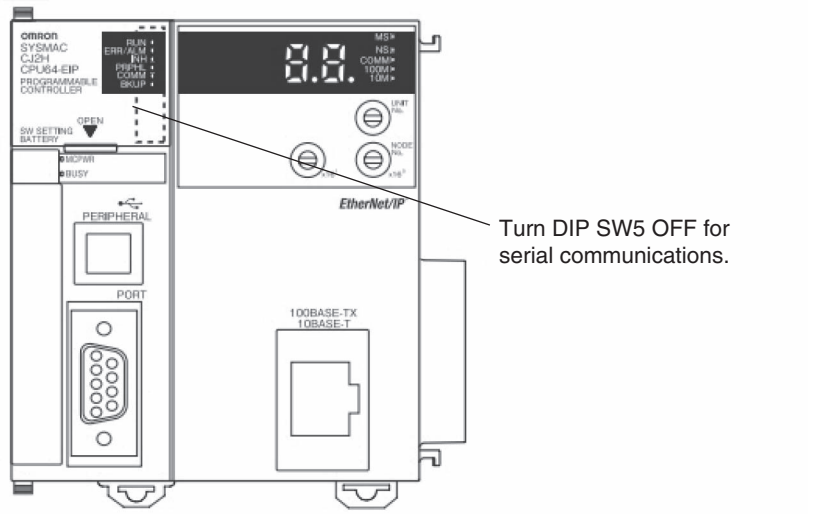
● PLC System Settings Area (for RS-232C)

Carry out setting by transmitting the [PLC System Settings] set up by a peripheral tool (CX-Programmer) to the CPU Unit. On the [Serial Port] options page of [PLC System Settings], set the connection mode to Host Link: 7 Data Bits, 2 Stop Bits, Even. And set the communication speed to the same as that of the NB Unit.

For details about the [PLC System Settings], refer to *SYSMAC CJ2 Series Software User's Manual* (W473).

● Settings for the front-side Switches

Set the DIP switch 5 of the CPU Unit as follows according to the NB-Series' port connected.



When connecting to a CS-Series Serial Communication Board

For CS1W-SCB21 type (Both of port 1 and 2 are RS-232C ports)

For CS1W-SCB41 type (Port 1 is RS-232C port and Port 2 is RS-422A/485 port.)

(Serial Communication Board for CS-Series CPU Units with RS-232C port, RS-422A port.)

● Settings for the DM Fixed Allocation Area of the CPU Unit

Write settings directly to the [DM Fixed Allocation Area] of the CPU Unit (System Settings Area) with a peripheral tool (programming console or CX-Programmer). After finishing the write-in, the settings can be activated through any of the methods of reconnecting the power supply, restarting the Unit, reactivating the communication port, executing the STUP instruction.

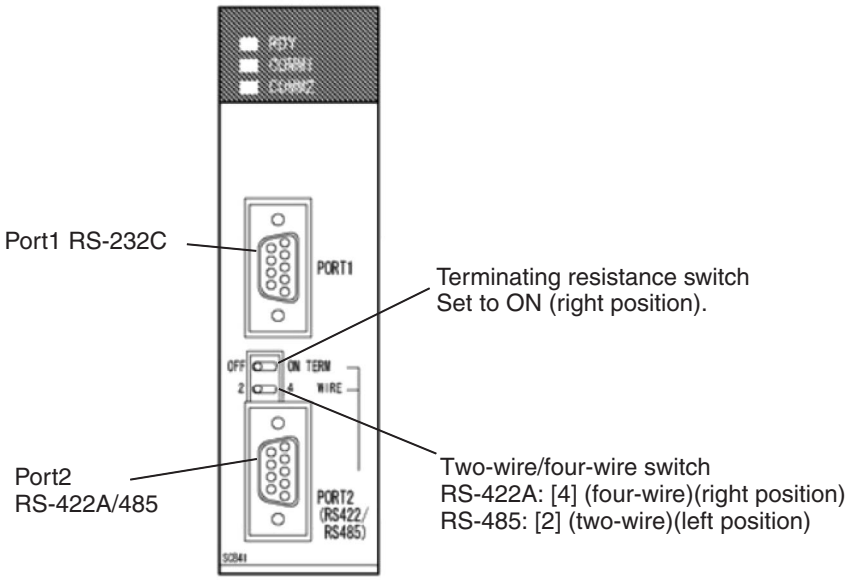
The followings are the Channel Nos. and settings of the DM Fixed Allocation Area.

It is the same when using RS-232C, RS-422A (port 2 of the CS1W-SCB41 type).

DM Fixed Allocation Area (CH)		Write Value	Setting
Port 1	Port 2		
DM32000	DM32010	8000	Use Host Link
DM32001	DM32011	0000~000A (*1)	Communication speed
DM32003	DM32013	0000	Unit No. 00

*1 The communication speed should be set to the same value as that of the NB Unit.

● Settings for front-side switches (For RS-422A)



When connecting to a CS-Series Serial Communication Unit

For CS1W-SCU21 type (Both of port 1 and 2 are RS-232C ports)

For CS1W-SCU31 type (Both of port 1 and 2 are RS-422A/485 ports) (Unit version1.3)

● Settings for the DM Fixed Allocation Area of the CPU Unit

Write settings directly to the [DM Fixed Allocation Area] of the CPU Unit (System Settings Area) with a peripheral tool (programming console or CX-Programmer). After finishing the write-in, the settings can be activated through any of the methods of reconnecting the power supply, restarting the Unit, reactivating the communication port, executing the STUP instruction.

The followings are the Channel Nos. and settings of the DM Fixed Allocation Area.

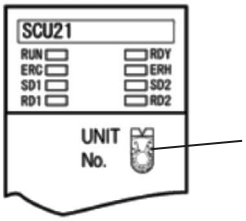
m = DM30000 + 100 × Unit No. (CH)

DM Fixed Allocation Area (CH)		Write Value	Setting
Port 1	Port 2		
m	m+10	8000	Use Host Link
m+1	m+11	0000~000A (*1)	Communication speed
m+3	m+13	0000	Unit No. 00

*1 The communication speed should be set to the same value as that of the NB Unit.

● Settings for the front-side Switches (Take CS1W-SCU21 as an example)

Set the Unit No. of the serial communication Unit by the rotary switch on the front side of the Unit. Use a straight screwdriver set the switches as follows to display the numbers and symbols shown in the table.



• Unit number settings
Set it to [0] ~ [F] in order to avoid duplicating other Units.

When connecting to a CJ Series Serial Communication Unit

For CJ1W-SCU21 type (Both of port 1 and 2 are RS-232C ports)

For CJ1W-SCU31 type (Both of port 1 and 2 are RS-422A/485 ports) (Unit version1.3)

For CJ1W-SCU41 type (Port 1 is RS-422A/485 port and Port 2 is RS-232C port.)

● Settings for the DM Fixed Allocation Area of the CPU Unit

Write settings directly to the [DM Fixed Allocation Area] of the CPU Unit (System Settings Area) with a peripheral tool (programming console or CX-Programmer). After finishing the write-in, the settings can be activated through any of the methods of reconnecting the power supply, restarting the Unit, reactivating the communication port, executing the STUP instruction.

The followings are the Channel Nos. and settings of the DM Fixed Allocation Area.

It is the same when using RS-232C, RS-422A.

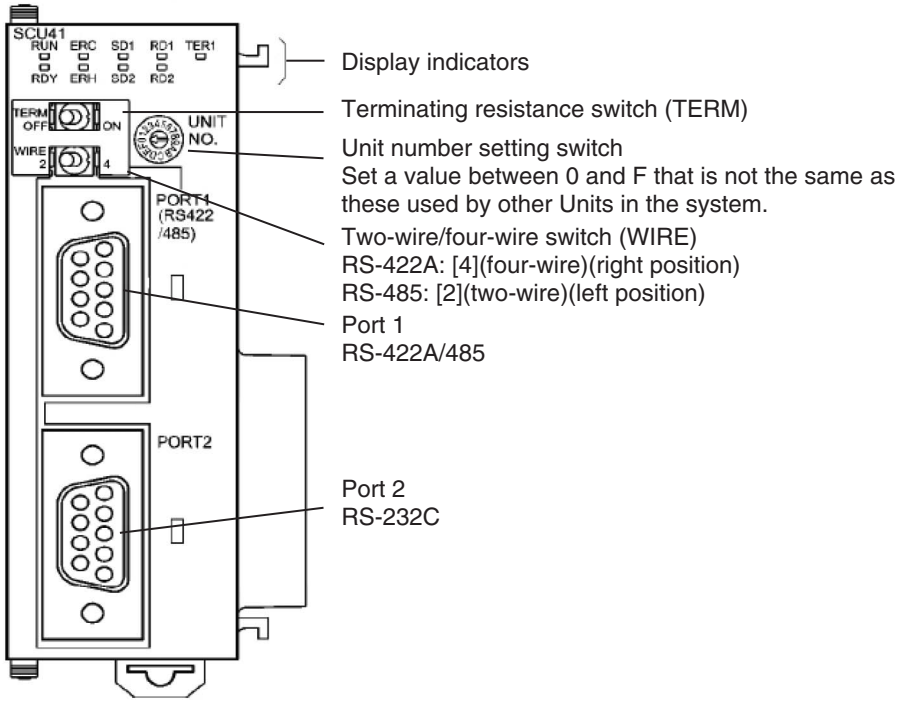
m = DM30000 + 100 × Unit No. (CH)

DM Fixed Allocation Area (CH)		Write Value	Setting
Port 1	Port 2		
m	m+10	8000	Use Host Link
m+1	m+11	0000~000A (*1)	Communication speed
m+3	m+13	0000	Unit No. 00

*1 The communication speed should be set to the same value as that of the NB Unit.

● Settings for the front-side Switches (Take CJ1W-SCU41 as an example)

CJ1W-SCU41



2-5 UDP Communication Connection

This section describes how to connect the PT with the Host through the UDP protocol.

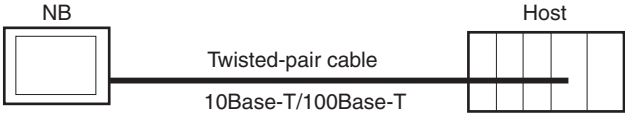
Note Both OMRON CJ/CS/NJ Series Ethernet UDP and OMRON CP Series Ethernet UDP communication protocols are UDP protocol. The difference between these two protocols is only in the address range of the channel.
When using OMRON Ethernet UDP communication protocol, EM4 bank or higher cannot be accessed at bit level.

2-5-1 Connecting to Host Via Ethernet

To connect to the network using Ethernet, the network number, node number, and IP address must be set. Use the NB-Designer to set the settings. (The default IP address of PT Unit is 192.168.250.1.)

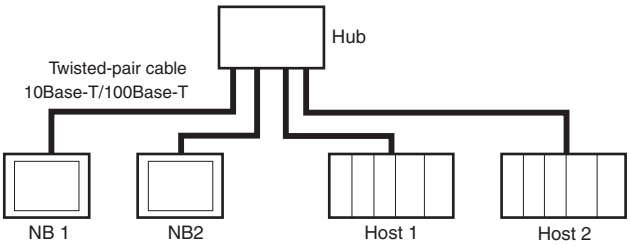
● Connecting PT Directly to the Host

Connect the NB to the host using twisted-pair cable.

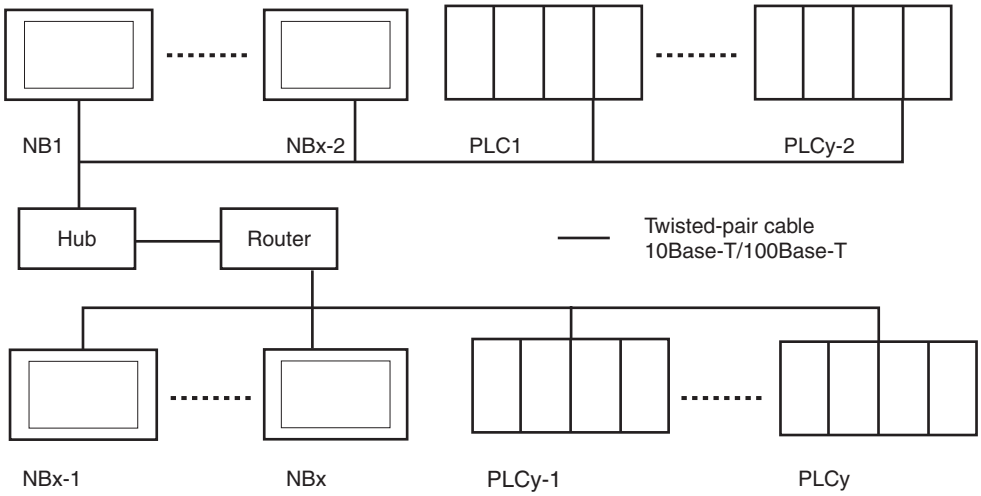


● Connecting PT to Host with a Hub

Multiple NBs and hosts can be connected using twisted-pair cable and a hub.



● The UDP communication for NB series products is only limited the local network, but the Ethernet communication crossing the network segment is allowable with the prerequisite of using the router. That's to say, the supported network is only limited to the local network, but the various devices in the network can cross the network segment. Please take the following architecture as reference.



X represents the amount of NB series products, and y represents the amount of PLC. The relationship between x and y must meet the following conditions:

- $x \geq 1$
- $y \geq 1$
- $x + y \leq 33$

In this system architecture, the system has only one network number. And the unique ID, i.e. Node ID, is assigned to both NB and PLC in the system.

When the actual amount of configured devices (NB series products + PLC) is greater than 33, the customer can create a new NB-Designer project to handle this problem.

● Recommended Network Configuration Devices

The following products are recommended for configuring the network when an Ethernet Unit is used.

Part	Maker	Model number	Specifications	Inquires
Hub	100BASE-TX			
	OMRON	W4S1-03B	10/100 Mbit/s 3-port switching hub	
	OMRON	W4S1-05B(C)	10/100 Mbit/s 5-port switching hub	
	Phoenix Contact	SWITCH5TX	10/100 Mbit/s 5-port switching hub	
Twisted-pair cable	100BASE-TX			
	Fujikura	CTP-LAN50.5mm x 4P	UTP (unshielded twisted-pair) cable: Category 5, 5e	
	10BASE-T			
	Fujikura	CTP-LAN50.5mm x 4P	UTP (unshielded twisted-pair) cable: Category 3, 4, 5, 5e	
Connectors (Modular plug)	UTP Plug			
	Panduit Corp	MP588-C	---	

Precautions on Laying Twisted-pair Cable

● Basic Precautions

- Push the cable connector until it clicks into the place both the PLC and the hub.
- After laying the twisted-pair cable, check the connection with a 10Base-T cable tester.

● Environment Precautions

- The UTP cable is not shielded. Also, hub is created for use under OA environment. Construct a system using a hub suitable for use under FA environment in locations subject to noise.
- Do not lay the twisted-pair cable together with high-voltage lines.
- Do not lay the twisted-pair cable near devices that generate noise.
- Do not lay the twisted-pair cable in locations subject to high temperature or high humidity.
- Do not lay the twisted-pair cable in locations subject to excessive dirt and dust or to oil mist or other contaminants.

● Hub Installation Environment Precautions

- Do not install the hub near devices that generate noise.
- Do not install the hub in locations subject to high temperature or high humidity.
- Do not install the hub in locations subject to excessive dirt and dust or to oil mist or other contaminants.

Connecting the Cable

Note 1 Turn OFF the PLC's power supply before connection or disconnecting twisted-pair cable.

2 Allow enough space for the bending radius of the twisted-pair cable.

1 Lay the twisted-pair cable.

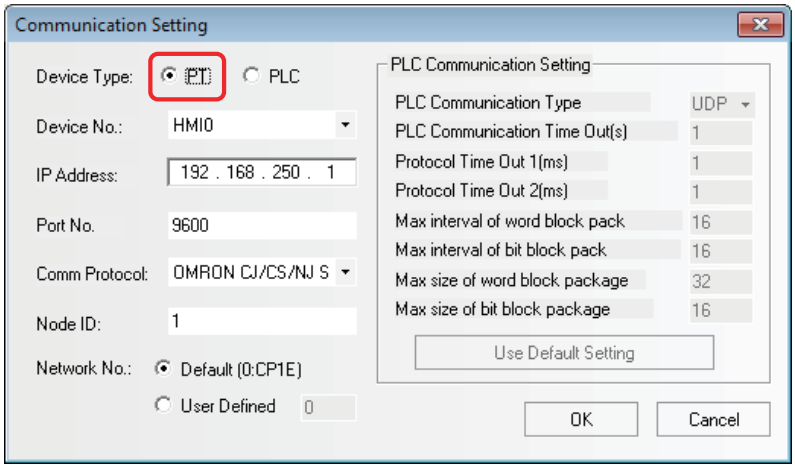
2 Connect the cable to the hub. Be sure to press in the cable until it locks into place.
Request cable installation from a qualified professional.

3 Connect the cable to the connector on the PLC. Be sure to press in the cable until it locks into place.

2-5-2 Parameter Settings for UDP at NB Side

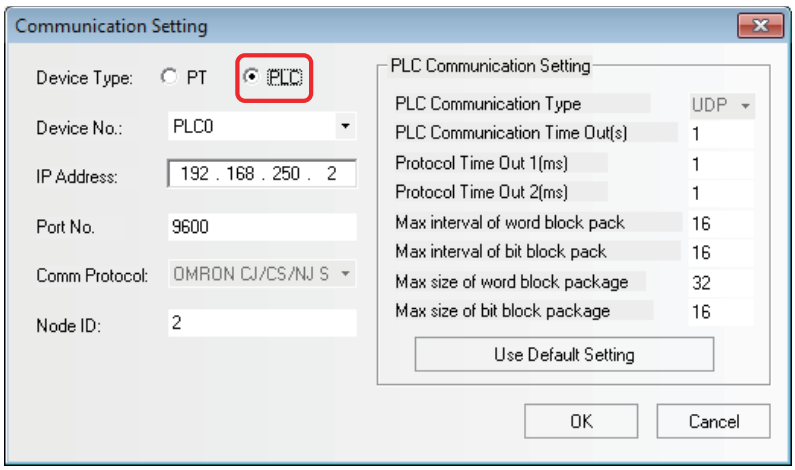
After placing the desired PT and PLC into Configuration and Setup Window, select [Communication Setting] in the [Option] menu, and then click the “Add” button after the “Communication Setting” dialog box pops up.

After selecting the Device Type and the related UDP protocol, you can make settings of IP Address, Node ID and Network No. and etc. for the PT.



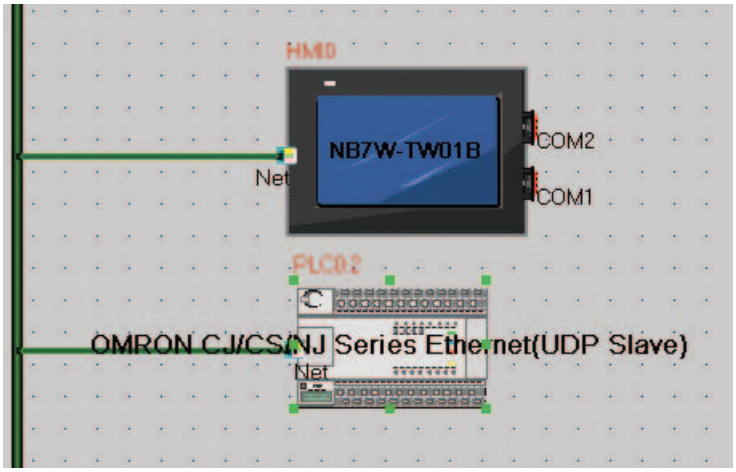
Note When there is CP1E PLC in the UDP network architecture, the Network No. should be 0. Otherwise, the communications through the UDP protocol between the NB and CP1E in this architecture will be impossible.

The settings of IP Address, Node ID and related communication parameters for PLC can be made.



Note The settings of communication parameters should be the same as that of the actual PLC.

Take the communication between single PT and the PLC of Omron CJ2M-CPU33 (hereinafter abbreviated as “PLC0”) as example:

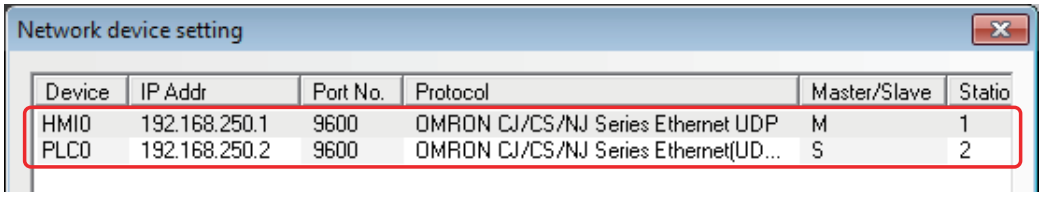


Configure the devices and set the communication parameters in the Configuration and Setup Window, then click [Add] in [PT Property] - [PT] - [Communication Setting] to set parameters for PT network-interface communication.

● PT settings (sample)

Device Type	Device No.	IP Address	Port Number	Communication Protocol	Mater/Slave	Station No. / Node Number
PT	HMI0	192.168.250.1	9600	OMRON CJ/CS/NJ Series Ethernet UDP	M(Master)	1
PLC	PLC0	192.168.250.2	9600	OMRON CJ/CS/NJ Series Ethernet (UDP Slave)	S(Slave)	2

Please note that the IP address set here should be same as the actual IP address of PLC during the configuration. The result is shown as below:



2-5-3 Host Types and Settings of Ethernet Unit

Units that are used for Ethernet communications vary according to the type and series of OMRON PLC used.

When connecting an Ethernet Unit, check the series and type of the PLC that it will be connected to and the model of the Unit that is mounted to the PLC.

Connecting the Controllers and NB Series Units by the combinations in the table below.

Series name	Using the built-in board	Using an Ethernet Unit	Ethernet Unit
CS Series	—	CS1G/H-CPU□□(-V1)	CS1W-ETN21
		CS1G/H-CPU□□H	
		CS1D-CPU□□H	CS1W-ETN21
CJ Series	—	CJ1G/H-CPU□□H	CJ1W-ETN21
		CJ1M-CPU□□(-ETN)	
	CJ1M-CPU□□-ETN	—	—
	—	CJ2H-CPU□□(-EIP)	CJ1W-ETN21
		CJ2M-CPU□□	
CP1H Series	—	CP1H-Y	CJ1W-ETN21 CP1W-CIF41
		CP1H-XA	
		CP1H-X	
CP1L Series	—	CP1L-L14/20	CP1W-CIF41
		CP1L-M30/40/60	
	CP1L-EL20	—	—
	CP1L-EM30/40		
CP1E Series	—	CP1E-N30	CP1W-CIF41
		CP1E-N40	
		CP1E-N60	
		CP1E-NA20	

For details on the hosts that can be connected to NB-series PTs via the Ethernet, refer to *A-5 List of Models.*

● Host Settings

The types of hosts that can be connected to NB-series PTs with the Ethernet and the host settings are as follows. The following settings must be set at the host.

Item	Host Settings
Number of nodes	33 (See note 1)
Network number	0 to 127 (See note 2)
UDP port number	1024 to 65535, default is 9600.
IP address	0.0.0.0 to 255.255.255.255
Subnet mask	0.0.0.0 to 255.255.255.255
Default gateway	0.0.0.0 to 255.255.255.255
Node number	0 to 254 (See note 3)

Note 1 The max total number of registered nodes by NB-Designer in the network is 33, at least 1 NB-series PT and 1 host included.

2 If there is CP1E PLC in the actual network architecture, the Network No. must be set to 0.

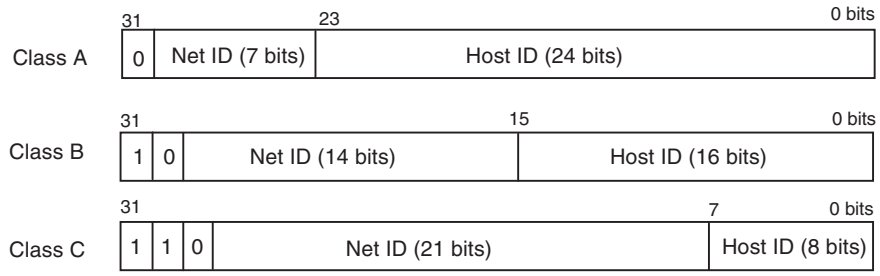
3 The Node ID of 0 is equivalent to that of 1 (default).

For the limitations to the Host parameters' setting, refer to *2-5-5 Parameter Settings at Host Side (CX-Programmer)*.

IP Address Configuration

The IP address is comprised of 32 bits of binary data, consisting of the net ID and host ID. The net ID is the address that identifies the network, and the host ID is the ID that identifies the host (node).

The IP address is divided into class A, B, and C. Select the address system from among the classes according to the network configuration.



The number of networks and hosts that can be identified depends on the class used.

Class	Network scope	Number of hosts
Class A	Small	2^{24} - 2 max. (16,777,214 max.)
Class B	Medium	2^{16} - 2 max. (65,534 max.)
Class C	Large	2^{8} - 2 max. (254 max.)

The IP address is a 32-bit value divided into four 8-bit fields. Each octet is expressed as a decimal and is separated by a period.

Example: 10000010 00111010 00010001 00100000 →130.58.17.32

Additional Information

- Set the same net ID for all nodes in the same network.
- The net ID of the IP address is the value that identifies the Ethernet network (IP network segment). The net ID is not the same as the network address used for FINS communications.
- The IP network segment is the logical network unit that is configured by the nodes that have the same net ID.

IP Address Allocation

The IP addresses are allocated so that they are unique for each node in the network (or between two or more networks). If two or more nodes are allocated the same IP address, the remote nodes with the same IP address will also malfunction.

IP (Internet Protocol) is a communications protocol that conforms to international standards. Therefore, to connect to the Internet, always obtain IP addresses that have been allocated by a public organization (i.e., the NIC in the country of use, such as the JPNIC in Japan). Using IP addresses that are not recognized by the NIC (JPNIC) to connect to the Internet could have unforeseen social consequences, such as causing the networks of another organizations to malfunction unexpectedly.

Local IP Address

The local IP address indicates the IP address of the Ethernet Unit that is used to set the settings.

The following IP address settings are not possible.

Net ID with all bits set to 0 or 1.

Host ID with all bits set to 0 or 1.

Subnet ID with all bits set to 1.

IP addresses that begin with 127 (7F Hex) (e.g., 127.35.21.16).

Subnet Mask

When more than one node is connected to the network, network operation and management can be difficult. Therefore, for convenience, configure the system by dividing a single network into multiple sub-networks. The system operates internally as multiple networks, but externally appears as a single network.

To operate a system in this way, divide the host ID field of the IP address into a subnet ID field and a host ID field.

The subnet ID field is identified by the information in the subnet mask. The subnet mask is a bit mask in which the net ID and subnet ID fields are 1 and the host ID field is 0.

Example: 11111111 11111111 11111111 00000000 → FFFFFF00

The subnet mask must have a value that is common to all nodes on the same sub-network.

Setting the subnet mask is not required if sub-networks are not used. The system recognizes subnet masks without a subnet ID field (i.e., subnet masks with net ID and host ID fields only).

The methods for setting each Unit are described next.

CS-series PLCs

Note 1 Always turn OFF the power to the PLC before setting the rotary switches.

2 Create I/O tables for the CPU Unit when setting the unit number for the first time or changing settings.

CS-series Ethernet Units:

CS1W-ETN21

● Setting the Front Panel Switches

Setting Unit Numbers

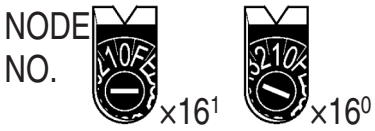
Always set the unit numbers so that the unit numbers of other CPU Bus Units mounted to the CPU Unit are all unique.

Use a small screwdriver to set the rotary switches, being careful not to damage them.

The factory setting is 0.

Setting range
0 to F

Setting Node Numbers



Setting range
01 to FE (1 to 254 decimal)

Set the upper digit using the left rotary switch and the lower digit using the right rotary switch.

The factory setting is 01. The Node ID of the rotary switch here must be consistent with that of PLC in the “Communication Setting” dialog box for the actual project created in the NB-Designer.

● Setting Local IP Addresses

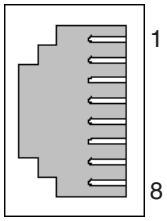
For CS-series Ethernet Units, set the local IP address from the CX-Programmer or other Support Software for the CPU Unit. Refer to the SYSMAC CS/CJ Series Ethernet Unit Operation Manual (Cat. No. W420) for details on setting methods.

● Ethernet Connectors

CS1W-ETN21

This is the connector used to connect the twisted-pair cable to the Ethernet.

- Electrical characteristics: Conforms to IEEE802.3 standards.
- Connector structure: RJ45 8-pin modular connector (conforms to ISO8877).



Connector Pin	Signal name	Abbreviation	Signal direction
1	Send data +	TD+	Output
2	Send data -	TD-	Output
3	Receive data +	RD+	Input
4	Not used.	-	-
5	Not used.	-	-
6	Receive data -	RD-	Input
7	Not used.	-	-
8	Not used.	-	-

CJ-series PLCs

Note 1 Always turn OFF the power to the PLC before setting the rotary switches.

2 Create I/O tables for the CPU Unit when setting the unit number for the first time or changing settings.

CJ-series Ethernet Units:

CJ1W-ETN21

● Setting the Front Panel Switches

Setting Unit Numbers

Always set the unit numbers so that the unit numbers of other CPU Bus Units mounted to the same CPU Unit are all unique.

Use a small screwdriver to set the rotary switches, being careful not to damage them.

The factory setting is 0.

Setting range
0 to F

Setting Node Numbers

Set the node numbers as hexadecimal values with the node number setting switch. Always set the node numbers so that other Ethernet Units connected to the same Ethernet network all have unique addresses. As long as the addresses are unique, they can be set between 01 and FE (1 to 254 decimal).

Setting range
01 to FE (1 to 254 decimal)

Set the upper digit using the top rotary switch and the lower digit using the bottom rotary switch.

The factory setting is 01.

● Setting Local IP Addresses

For CJ-series Ethernet Units, set the local IP address from the CX-Programmer or other Support Software for the CPU Unit. Refer to the SYSMAC CS/CJ Series Ethernet Unit Operation Manual (Cat. No. W420) for details on setting methods.

● Ethernet Connectors

CJ1W-ETN21

This is the connector used to connect the twisted-pair cable to the Ethernet.

- Electrical Characteristics: Conforms to IEEE802.3 standards.
- Connector Layout: RJ45 8-pin modular connector (conforms to ISO8877).

Additional Information

- CX-Programmer version 8.1 or higher is required when CP1W-CIF41 is used.

CP-series PLCs

CP-series Ethernet Option Board

CP1W-CIF41

● Setting Node Numbers

Set the node number to a unique value. Do not set it to the same value as any other Ethernet node on the same Ethernet network. Refer to the following manuals for the setting procedures.

CP1H: SYSMAC CP Series CP1H CPU Unit Operation Manual (Cat. No. W450)

CP1L: SYSMAC CP Series CP1L CPU Unit Operation Manual (Cat. No. W462)

CP1E: SYSMAC CP Series CP1E CPU Unit Software User's Manual (Cat. No. W480)

Setting Local IP Addresses

Use a Web browser to set the local IP address of the CP-series Ethernet Option Board.

Refer to the following manuals for the setting procedures.

CP1H: SYSMAC CP Series CP1H CPU Unit Operation Manual (Cat. No. W450)

CP1L: SYSMAC CP Series CP1L CPU Unit Operation Manual (Cat. No. W462)

CP1E: SYSMAC CP Series CP1E CPU Unit Software User's Manual (Cat. No. W480)

Ethernet Connector

CP1W-CIF41

This is the connector used to connect the twisted-pair cable to the Ethernet.

- Electrical Characteristics: Conform to the IEEE 802.3 standard.
- Connector Layout: RJ45 8-pin modular connector (conforms to ISO8877.)

CP1L-EL/EM

Setting Node Numbers

Set the node number to a unique value from the CX-Programmer or other Support Software. Do not set it to the same value as any other Ethernet node on the same Ethernet network. Refer to the following manuals for the setting procedures.

CP1L-EL/EM: SYSMAC CP Series CP1L-EL/EM CPU Unit Operation Manual (Cat. No. W516)

Setting Local IP Addresses

Set the local IP address from the CX-Programmer or other Support Software for the CP1L-EL/EM series CPU Unit.

Refer to the following manuals for the setting procedures.

CP1L-EL/EM: SYSMAC CP Series CP1L-EL/EM CPU Unit Operation Manual (Cat. No. W516)

Ethernet Connector

CP1L-ETN21

This is the connector used to connect the twisted-pair cable to the Ethernet.

- Electrical Characteristics: Conform to the IEEE 802.3 standard.
- Connector Layout: RJ45 8-pin modular connector (conforms to ISO8877.)

2-5-4 Host Types and Settings of Ethernet/IP Unit

NB-series PTs can communicate with CS/CJ-series Ethernet/IP Units and NJ□01, CJ2H-CPU□□-EIP, CJ2M-CPU3□.

Units that are used for Ethernet/IP communications vary according to the type and series of OMRON PLC used.

When connecting an Ethernet/IP Unit, check the series and type of the PLC that it will be connected to and the model of the Unit that is mounted to the PLC.

NB-series PTs and the following Controllers can be connected with Ethernet/IP units.

Series name	Using the built-in board	Using an EtherNet/IP Unit	EtherNet/IP Unit
CS Series	—	CS1G/H-CPU□□(-V1) CS1G/H-CPU□□H CS1D-CPU□□H	CS1W-EIP21
CJ Series	—	CJ1G/H-CPU□□H CJ1M-CPU□□(-ETN)	CJ1W-EIP21
	CJ2H-CPU□□-EIP	—	—
	CJ2M-CPU3□	—	—
	—	CJ2H-CPU□□(-EIP) CJ2M-CPU□□	CJ1W-EIP21
CP Series	—	CP1H	CJ1W-EIP21
NJ Series	NJ□01	—	—

Note Ethernet/IP Unit: Unit version 2.1 or later, the CJ2H-CPU□□-EIP and CJ2M-CPU3□ CPU Units have a built-in Ethernet connector.

For details on the hosts that can be connected to NB-series PTs via the Ethernet/IP, refer to *A-5 List of Models*.

Refer to the following manual for host parameter settings:

SYSMAC CS/CJ-series Ethernet/IP Units Operation Manual (Cat. No. W465),

SYSMAC CJ-series CJ2 CPU Units Operation Manual (Cat. No. W472).

For the limitations to the Host parameters' setting, refer to *2-5-5 Parameter Settings at Host Side (CX-Programmer)*.

Refer to the following manual for the setting methods of each parameter, when connecting an NJ-series CPU Unit:

NJ Series CPU Unit Built-in EtherNet/IP Port User's Manual (Cat. No. W506)

There are limitations on the parameters' setting. Refer to *2-5-6 Parameter Settings at Host Side (Sysmac Studio)* for details.

Connecting to a CJ-series CPU Unit

Note 1 Always turn OFF the power to the PLC before setting the rotary switches.

2 Create I/O tables for the CPU Unit when setting the unit number for the first time or changing settings.

CJ-series CPU Unit (Built-in EtherNet/IP Port):

CJ2H-CPU□□-EIP

CJ2M-CPU3□

● Setting Local IP Addresses

Set the local IP address with the CX-Programmer or other Support Software.

Refer to the *SYSMAC CS/CJ Series Ethernet/IP Units Operation Manual* (Cat. No. W465) for details on setting methods.

● Setting the Front Panel Switches

Setting the Unit Numbers

Set a unique unit number for the CJ2 CPU Unit built-in Ethernet/IP port. The same unit number cannot be used by any other CPU Bus Unit connected to the CJ2 CPU Unit.

Use a small screwdriver to make the setting, and be sure not to damage the rotary switch. The unit number is factory-set to 0.

Setting range
0 to F

Setting Node Numbers

Set a node address for the built-in Ethernet/IP port. With the OMRON CJ/CS/NJ/CP UDP drive communications service, multiple Ethernet/IP Units (including the CJ2 Unit built-in Ethernet/IP port) connected by Ethernet are identified by their node addresses. Using the node address switches, set a unique node address in hexadecimal. The same node address cannot be used by any other Ethernet/IP Unit or Ethernet Unit connected on the same Ethernet network.

As long as it does not duplicate any other address, the node address can be set from 01 to FE (1 to 254 in decimal).

Setting range
01 to FE hex (1 to 254 decimal)

Note The node address is factory-set to 01. With the default setting, the values set on these switches become the last two digits of the built-in Ethernet/IP port's IP address.

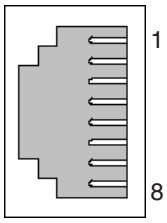
The default IP address is 192.168.250.node_address. With the factory-set node address of 01, the default IP address is 192.168.250.1.

The Node ID of the rotary switch here must be consistent with that of PLC in the "Communication Setting" dialog box for the actual project created in the NB-Designer.

● Ethernet Connectors

This is the connector used to connect the twisted-pair cable to the Ethernet.

- Electrical Characteristics: Conforms to IEEE802.3 standards.
- Connector Layout: RJ45 8-pin modular connector (conforms to ISO 8877).



Connector Pin	Signal name	Abbreviation	Signal direction
1	Send data +	TD+	Output
2	Send data -	TD-	Output
3	Receive data +	RD+	Input
4	Not used.	-	-
5	Not used.	-	-
6	Receive data -	RD-	Input
7	Not used.	-	-
8	Not used.	-	-

Connecting to a NJ-series CPU Unit

NJ-series CPU Unit (Built-in EtherNet/IP Port)

NJ□01

● Setting IP Addresses

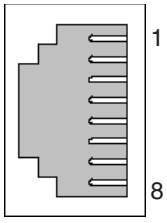
Set the IP address of the NJ unit with the Sysmac Studio.

Refer to the Sysmac Studio Version 1 Operation Manual (Cat. No. W504) and the NJ-series CPU Unit Built-in EtherNet/IP Port User's Manual (Cat. No. W501) for details on setting methods.

● Ethernet Connectors

This is the connector used to connect the twisted-pair cable to the Ethernet.

- Electrical Characteristics: Conforms to IEEE802.3 standards.
- Connector Layout: RJ45 8-pin modular connector (conforms to ISO 8877).



Connector Pin	Signal name	Abbreviation	Signal direction
1	Send data	TD+	Output
2	Send data -	TD-	Output
3	Receive data +	RD+	Input
4	Not used.	-	-
5	Not used.	-	-
6	Receive data -	RD-	Input
7	Not used.	-	-
8	Not used.	-	-

Connecting to a CS-series Ethernet/IP Unit

Note 1 Always turn OFF the power to the PLC before setting the rotary switches.

2 Create I/O tables for the CPU Unit when setting the unit number for the first time or changing settings.

CS-series EtherNet/IP Unit:

CS1W-EIP21

● Setting the Front Panel Switches

Setting Unit Numbers

Always set the unit numbers so that the unit numbers of other CPU Bus Units mounted to the same CPU Unit are all unique.

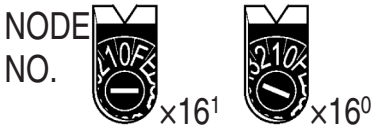
Use a small screwdriver to set the rotary switches, being careful not to damage them.

The factory setting is 0.

Setting range
0 to F

Setting Node Numbers

Use the node address switches to set the node address to a unique hexadecimal value. Do not set it to the same value as any other Ethernet/IP Unit or built-in port on the same Ethernet/IP network. As long as it does not duplicate the address of any other Ethernet/IP Unit or built-in port, the node address can be set from 01 to FE hex (1 to 254 decimal).



Setting range
01 to FE (1 to 254 decimal)

Set the upper digit using the left rotary switch and the lower digit using the right rotary switch.

The factory setting is 01. The Node ID of the rotary switch here must be consistent with that of PLC in the “Communication Setting” dialog box for the actual project created in the NB-Designer.

● Setting Local IP Addresses

Set the local IP address with the CX-Programmer or other Support Software.

For the setting procedure, refer to the *SYSMAC CS/CJ-series Ethernet/IP Units Operation Manual* (Cat. No. W465).

● Ethernet Connectors

This is the connector used to connect the twisted-pair cable to the Ethernet.

- Electrical Characteristics: Conforms to IEEE802.3 standards.
- Connector Layout: RJ45 8-pin modular connector (conforms to ISO 8877).

Connecting to a CJ-series Ethernet/IP Unit

Note 1 Always turn OFF the power to the PLC before setting the rotary switches.

2 Create I/O tables for the CPU Unit when setting the unit number for the first time or changing settings.

CJ-series EtherNet/IP Unit:

CJ1W-EIP21

● Setting the Front Panel Switches

Setting Unit Numbers

Always set the unit numbers so that the unit numbers of other CPU Bus Units mounted to the same CPU Unit are all unique.

Use a small screwdriver to set the rotary switches, being careful not to damage them.

The factory setting is 0.

Setting range
0 to F

Setting Node Numbers

Use the node address switches to set the node address to a unique hexadecimal value. Do not set it to the same value as any other Ethernet/IP Unit or built-in port on the same Ethernet/IP network. As long as it does not duplicate the address of any other Ethernet/IP Unit or built-in port, the node address can be set from 01 to FE hex (1 to 254 decimal).

Setting range
01 to FE (1 to 254 decimal)

Set the upper digit using the left rotary switch and the lower digit using the right rotary switch.

The factory setting is 01. The Node ID of the rotary switch here must be consistent with that of PLC in the “Communication Setting” dialog box for the actual project created in the NB-Designer.

● Setting Local IP Addresses

Set the local IP address with the CX-Programmer or other computer support software. Refer to the *Ethernet/IP Unit Operation Manual* (Cat. No. W465) for details on setting methods.

● Ethernet Connectors

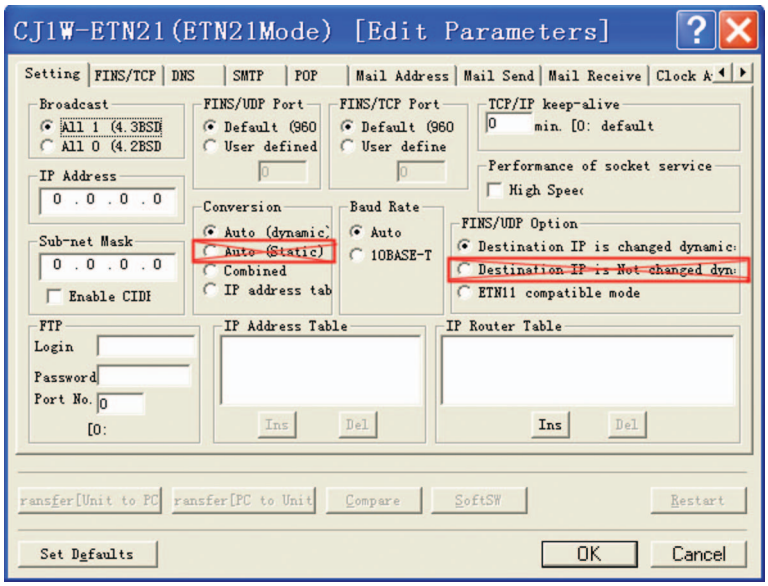
This is the connector used to connect the twisted-pair cable to the Ethernet.

- Electrical Characteristics: Conforms to IEEE802.3 standards.
- Connector Layout: RJ45 8-pin modular connector (conforms to ISO8877).

2-5-5 Parameter Settings at Host Side (CX-Programmer)

Because the port number of NB is dynamic, the user doesn't need to set it during the communications through the UDP protocol. But user needs to set the UDP parameters at the Host side of OMRON PLC in the CX-Programmer referring to the following limitations.

Take the settings of CJ1W-ETN21 as example:



The limitations are as follows:

1. Do not check the "Auto (Static)" option in the [Conversion] check box.
2. Do not check the "Destination IP is Not changed dyn:" in the [FINS/UDP Option] check box.
3. Only the "Destination IP is changed dynamic:" can be checked in the [FINS/UDP Option] check box after either of "Auto (dynamic)", "Combined" and "IP address table" is checked in the [Conversion] check box. When insert the IP address into the [IP Address Table] after the "IP address table" or "Combined" is checked, do not make the Node ID of NB into it. *1

*1 If the Node ID of NB is placed into the [IP Address Table], the system will require the NB to use the same port with the PLC, and "PLC response error" information will appear on NB.

The prompts for possible errors occurred to NB when UDP protocol is adopted are described as follows:

"PLC Response Error": Response to the abnormal information caused by the Read/Write command to PLC.

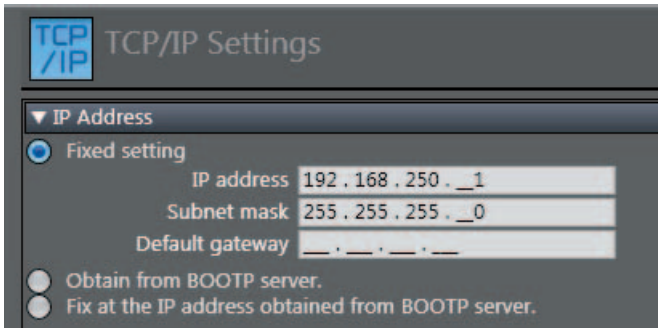
"PLC No Response: xx-xx-x": No response is made by PLC and xx-xx-x represents PT No.-Node ID of PLC-Port Number.

2-5-6 Parameter Settings at Host Side (Sysmac Studio)

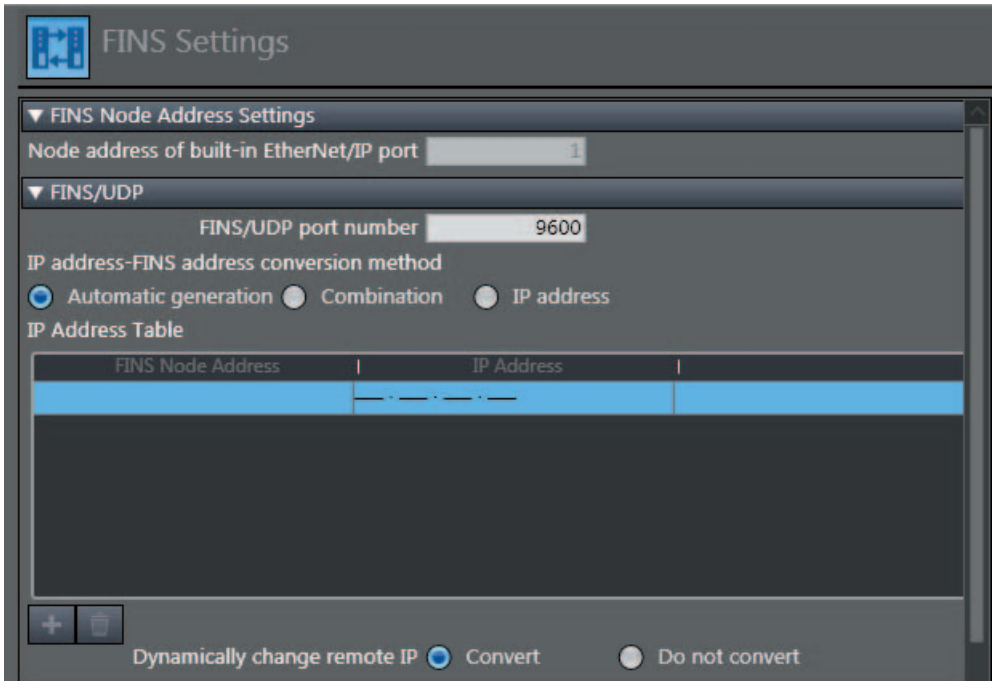
Because the port number of NB is dynamic, the user doesn't need to set it during the communications through the OMRON CJ/CS/NJ Series Ethernet UDP driver. But user needs to set the UDP parameters of the NJ-series controller in the Sysmac Studio referring to the following limitations.

Take the settings in the Sysmac Studio as example:

- **[TCP/IP] settings dialog**


TCP/IP Settings
IP Address
Fixed setting
IP address 192 . 168 . 250 . _1
Subnet mask 255 . 255 . 255 . _0
Default gateway
Obtain from BOOTP server.
Fix at the IP address obtained from BOOTP server.

- **[FINS settings] dialog**



The limitations are as follows:

1. Select the “Convert” in the [Dynamically change remote IP] setting.
2. Set the IP address in the [IP Address Table] when either the “IP address” or “Combination” is selected in the [IP address-FINS address conversion method] setting and do not set the Node ID of NB into it. *1

*1 If the Node ID of NB is placed into the [IP address Table], the system will require the NB to use the same port with the PLC, and “PLC response error” information will appear on NB.

The prompts for possible errors occurred to NB when OMRON CJ/CS/NJ Series Ethernet UDP driver is adopted are described as follows.

“PLC Response Error”: Response to the abnormal information caused by the Read/Write command to PLC.

“PLC No Response: xx-xx-x”: No response is made by PLC and xx-xx-x represents PT No.-Node ID of PLC-Port Number.

3

System Setting Mode

This section describes the System Setting Mode

3-1 Display Method of System Setting Mode 3-2
3-2 Functions of System Setting Mode 3-3

3-1 Display Method of System Setting Mode

Enter the System Setting Mode following the procedures below.

(1) Set both the DIP switches SW1 and SW2 on the back side to ON.

(2) Press the Reset switch, restart the NB Unit, and then it enters into the System Setting Mode.

3-2 Functions of System Setting Mode

The following items can be set in System Setting Mode:

(1) Time calibration: check whether the year, month, day, hour, minute and second are the current time values, and if not, rectify them manually.

(2) IP Address (Only supported by NB□□-TW01B): Sets the IP address for PT.

Port (Only supported by NB□□-TW01B): Sets the port number.

Subnet Mask (Only supported by NB□□-TW01B): Sets the subnet mask.

Gateway (Only supported by NB□□-TW01B): Sets the gateway.

(3) Startup Window No.: the window displayed after launching the NB Unit. The default is window 0.

(4) Backlight Saver Time: time to activate the screen saver, and the Unit is minute. The default is 10 minutes. The screen saver is not brought into effect when the set value is 0.

(5) Mute Enabled/Disabled: ON/OFF of the buzzer.

(6) Brightness Up/Down: with this, brightness of the screen can be adjusted, bringing the screen to its best visual effect.

(7) Export/Import (Only supported by NB□□-TW01B):

USB←PT: Uploads the user project file (.pkg) required by the PT operation to the USB memory. And the upload password is required during the export. If the upload password is not set, it needs to use the default password of 888888.

USB→PT: Downloads the user project file (.pkg) in USB memory to PT.

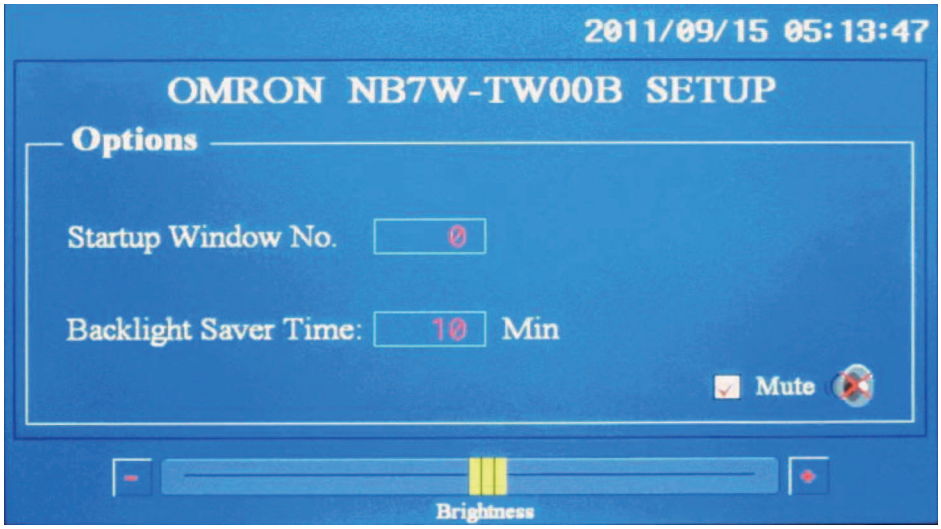
RCP←PT: Uploads the recipe data file (.rcp) in PT to the USB memory.

RCP→PT: Downloads the recipe data file (.rcp) in USB memory to PT.

(8) Enable Printer Function: refer to *Section 7 Pictbridge Printing* in *NB-Designer Operation Manual* for details.

The System Setting Mode screen of the NB7W-TW01B is as follows:

The System Setting Mode screen of the NB7W-TW00B is as follows:



If you want to change the month, touch where the month is (eg. 09), and a digit input keyboard will pop up. Input the month value, and touch the Enter button to confirm the change.

4

Calibrate Mode

This section describes the Calibrate Mode.

4-1 Display Method of Calibrate Mode 4-2
4-2 Functions of Calibrate Mode 4-2
4-3 On-line Touch-control Calibration Function 4-2

4-1 Display Method of Calibrate Mode

There are 2 methods for entering into Calibrate Mode.

(1) Set the DIP switches SW1 and SW2 on the back side respectively to OFF and ON.
Press the Reset switch, restart the NB Unit, and then it enters into the Calibrate Mode.

(2) Place a “Function Key” component in the window, and set its function to “Touch Calibration”.
Touch the “Function Key” component in the window to start Calibrate Mode.

4-2 Functions of Calibrate Mode

Procedures to carry out Calibrate Mode:

Track and touch the “+” displayed on the screen and you will hear a “touch”. Carry on with this, until the “+” disappear followed by a “TP Adjust Success!” turning up on the screen. Set both of the DIP switches SW1 and SW2 to OFF, press the Reset switch again.

4-3 On-line Touch-control Calibration Function

Besides using the DIP switches, Touch-control Calibration can also be achieved with a function key while the software is running, thus sparing the time of equipment adjustment and the trouble of opening the control panel. For details, refer to *3-7-2 Function Key* in the *NB-Designer Operation Manual*.

App

Appendices

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A-1 Specifications

A-1-1 General Specifications

Items	Specifications						
Model	NB3Q		NB5Q		NB7W		NB10W
	TW00B	TW01B	TW00B	TW01B	TW00B	TW01B	TW01B
Rated power supply voltage	DC24V±15%(DC20.4~27.6V)						
Power consumption	5W	9W	6W	10W	7W	11W	14W
Ambient operating temperature	0°C~50°C						
Ambient storage temperature	-20°C~60°C						
Ambient operating humidity	10%~90% RH (without condensation)						
Ambient storage humidity	10%~90% RH (without condensation)						
Operating environment	No corrosive gases						
Noise Immunity	Compliant with IEC61000-4-4, 2KV (Power cable)						
Vibration resistance (During operation)	10 to 57Hz with a 0.075mm amplitude, 57 to 150Hz 9.8m/s^2 for 30 min each in X, Y and Z directions						
Shock resistance (During operation)	147m/s^2 for 3 times each in X, Y and Z directions, with each time lasting for 11 ms						
Dimensions W×H×D(mm)	129.8×103.8×52.8		184.0×142.0×46.0		202.0×148.0×46.0		268.8×210.8×54.0
Panel opening dimension W×H(mm)	119.0×93.0		172.4×131.0		191.0×137.0		258.0×200.0
Panel thickness range	1.6~4.8 mm						
Weight	300g	305g	620g	627g	710g	715g	1525g
Degree of protection	Front operation part: IP65 (Dust proof and drip proof only from the front of the panel)						
Battery life	5 years (at 25 °C)						
Applicable standards	EC Directives, KC, cULus508						

Note 1 OMRON accepts repair and analysis of the NB Units including the display device for five years of the manufacture date.

2 The flash memory can be rewritten approximately 100,000 times at maximum.

A-1-2 Performance Specifications

● Display specifications

Items		Specifications						
		NB3Q		NB5Q		NB7W		NB10W
		TW00B	TW01B	TW00B	TW01B	TW00B	TW01B	TW01B
Display panel	Display device	3.5"TFT LCD		5.6"TFT LCD		7"TFT LCD		10.1"TFT LCD
	Number of dots	320×240		320×234		800×480		800×480
	Display color	65536 colors						
	Valid display area W×H(mm)	71×53		113×85		154×85		221×133
Backlight	Life	50,000 hours (Typ) of operating time at the normal temperature (25 °C) with 40% brightness*						
Front-side LED		ON: power connected OFF: power disconnected						

* Standard value for brightness to decrease by half at the normal temperature and humidity.

● Operation part specifications

Items	Specifications						
	NB3Q		NB5Q		NB7W		NB10W
	TW00B	TW01B	TW00B	TW01B	TW00B	TW01B	TW01B
Touch panel	Type: resistive type						
	Operation force: 0.5~0.8 N						
	Press endurance: min. 1,000,000 times (at 25 °C)						

● External I/F specifications

Items	Specifications						
	NB3Q		NB5Q		NB7W		NB10W
	TW00B	TW01B	TW00B	TW01B	TW00B	TW01B	TW01B
USB Slave	1 port (for screen data transmission with a PC and Pictbridge printing) Equivalent of USB 2.0 Full speed						
USB Host	-	1 port Equivalent of USB 2.0 Full speed	-	1 port Equivalent of USB 2.0 Full speed	-	1 port Equivalent of USB 2.0 Full speed	1 port Equivalent of USB 2.0 Full speed

● Programmer (a software for making screen data, and "✓" mark means support.)

Items / Name/Version	Specifications						
	NB3Q		NB5Q		NB7W		NB10W
	TW00B	TW01B	TW00B	TW01B	TW00B	TW01B	TW01B
NB-Designer version 1.0X	-	-	✓	-	✓	-	-
NB-Designer version 1.1X	-	-	✓	✓	✓	✓	-
NB-Designer version 1.2X	✓	✓	✓	✓	✓	✓	✓

A-1-3 Communication Specifications

● Host Link communication specifications

Items	Specifications						
	NB3Q		NB5Q		NB7W		NB10W
	TW00B	TW01B	TW00B	TW01B	TW00B	TW01B	TW01B
COM1	Compliant with EIA RS-232C/422A/485 D-sub, 9-pin connector socket At one point, only one from RS-232C, RS-422A and RS-485 can be designated to perform communications Communication cable length: Max.15m (RS-232C) Max. 500m (RS-422A/485)		Compliant with EIA RS-232C D-sub, 9-pin connector socket Pin 6 DC +5V output (Max. current: 250mA) Communication cable length: Max.15m				
COM2	-		Compliant with EIA RS-232C/422A/485 D-sub, 9-pin connector socket At one point, only one from RS-232C, RS-422A and RS-485 can be designated to perform communications Communication cable length: Max.15m (RS-232C) Max. 500m (RS-422A/485)				

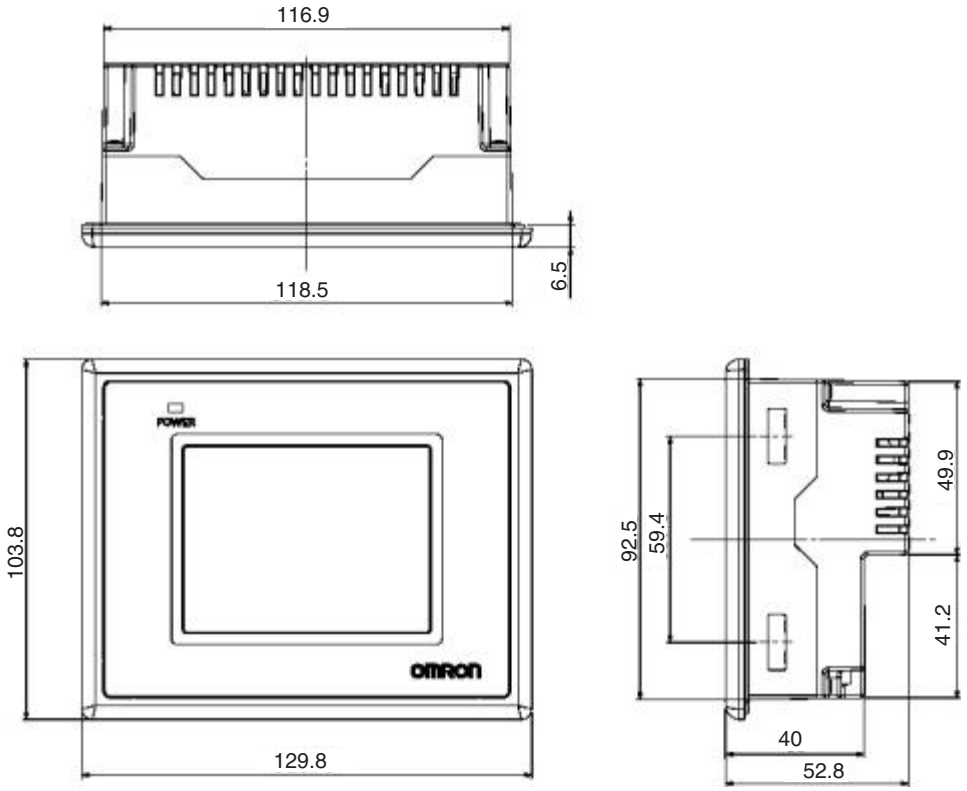
● Ethernet communication specifications

Note The PT of the NB□□-TW01B has the Ethernet connection function.

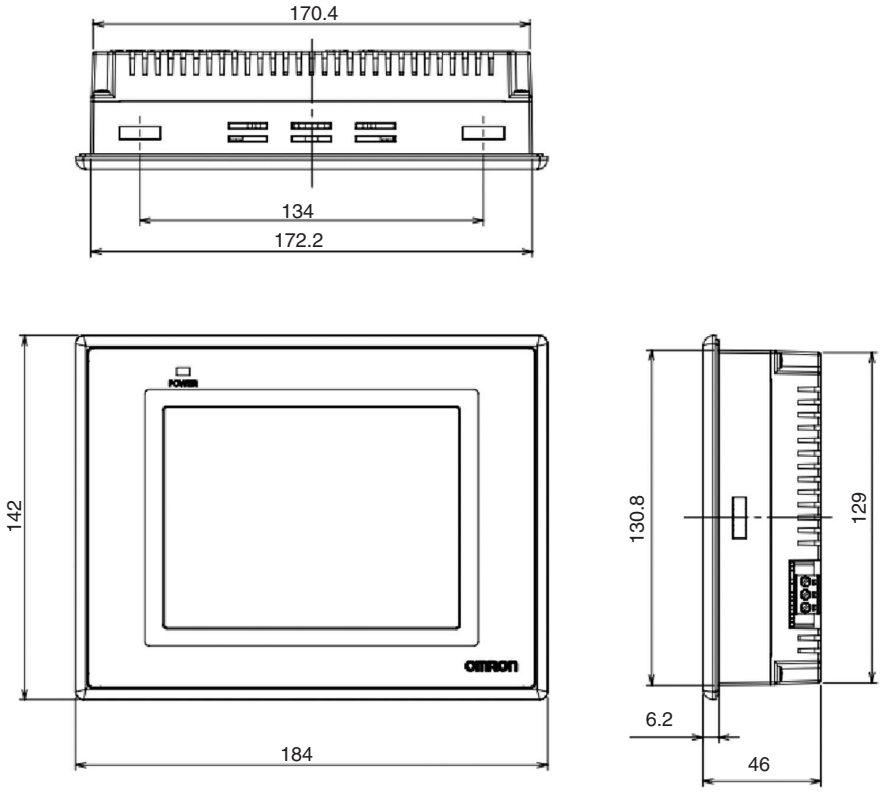
Items	Specifications
Conformance standards	Conforms to IEEE 802.3 / Ethernet (10/100Base-T)
Transmission medium	2 pair Cat 3 UTP 22 to 26AWG, Cat 5, Cat 5e, Cat 6
Transmission distance	100 m (node-to-hub and hub-to-hub)
Connector	8-pin modular connector

A-2 External Dimensions

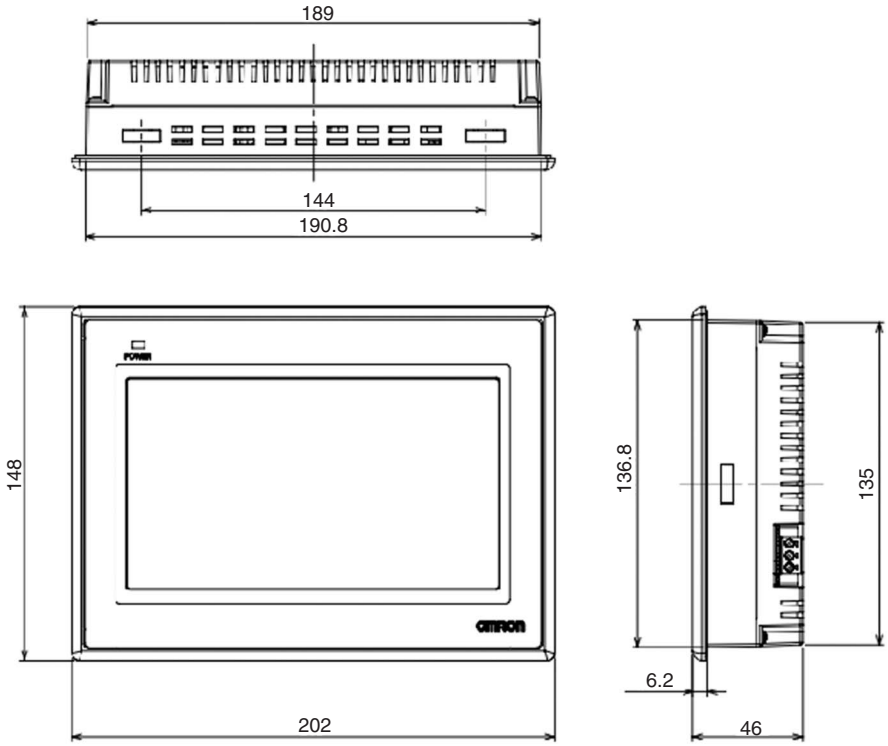
- **NB3Q-TW00B/NB3Q-TW01B model**



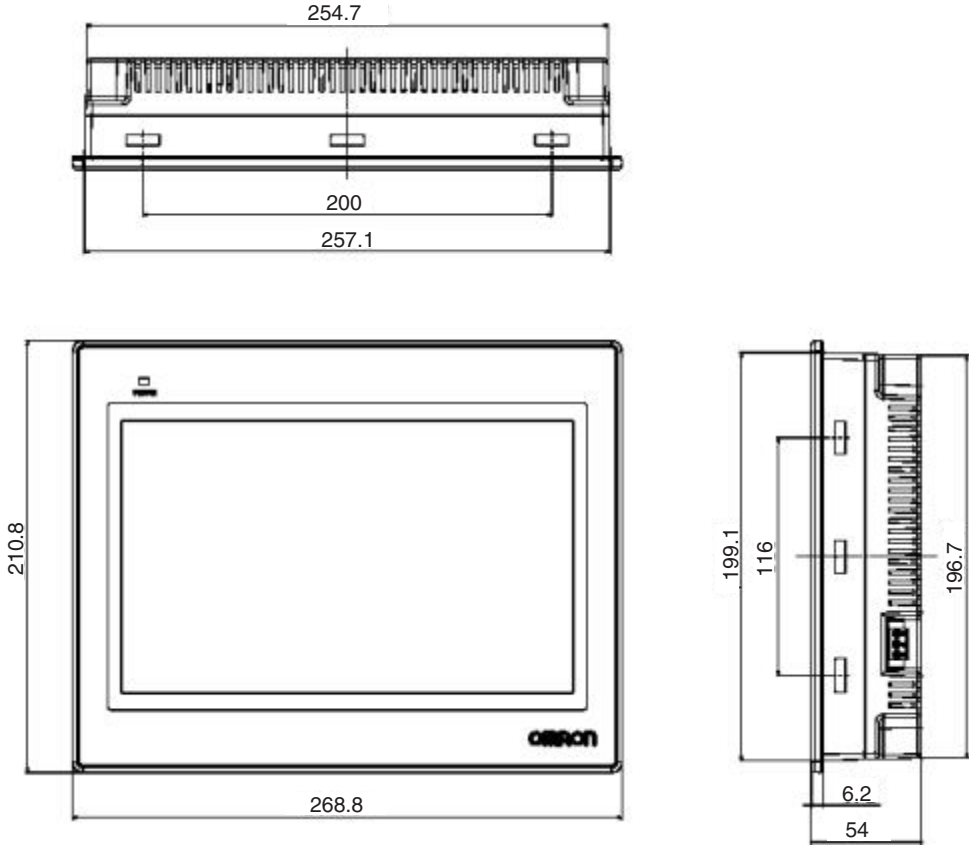
- **NB5Q-TW00B/NB5Q-TW01B model**



● NB7W-TW00B/NB7W-TW01B model



● NB10W-TW01B model



A-3 RS-422A/485 Connections

A-3-1 Grounding and Shielding of the Cables

When performing communications using RS-422A/485, carry out the connections, shielding and grounding as follows:

● Grounding wiring

The NB Unit has a functional grounding terminal (FG: ⏚).

(1) Generally, make the grounding according to Fig. (a).
- Connect the grounding terminals (GR) of the devices and the functional grounding terminal (⏚), at only one point make a D-type grounding (Max. grounding resistance 100Ω).
- Short-circuit the LG terminal and GR terminal of the PLC.
- Use a cable with a minimum of 2 mm^2 for the grounding cable.
- For details about the connection methods, refer to the related communication Unit manuals.

(2) As shown in Fig. (b), when the NB Unit, and noise source equipments such as motors and inverters, etc. are installed on the same panel, do not ground the NB Unit's functional grounding terminal (⏚).

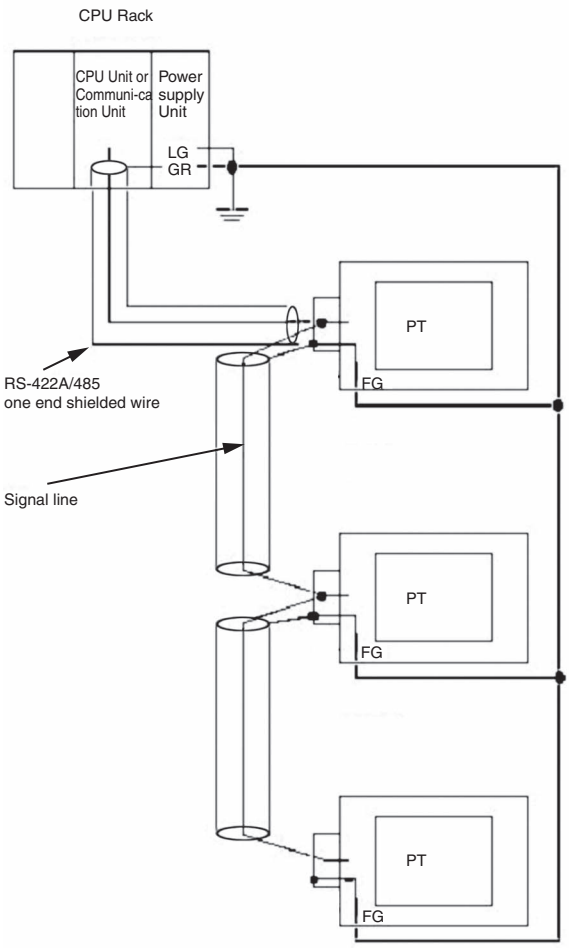
● Shielding of RS-422A/485 Cables

Be sure to shield the RS-422A/485 cables. Connect the grounding terminals (GR) of the devices and the functional grounding terminals (⏚), at only one point make a D-type grounding (Max. grounding resistance 100Ω), carry out a single-end shielding according to Fig. (a).

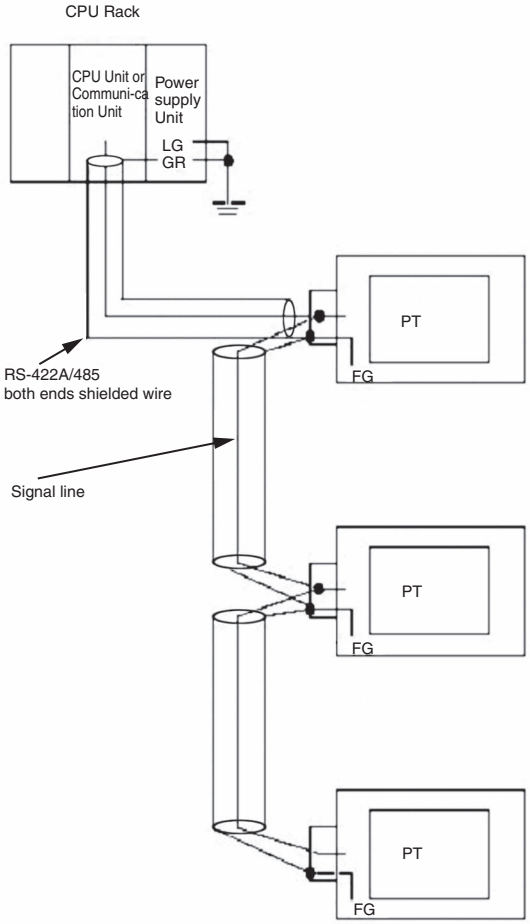
If grounding is not done to the functional grounding terminal (⏚) of the NB Unit, shield both ends as shown in Fig. (b).

Note In order to avoid malfunctions caused by interferences, shield the cables properly.

Figure(a)



Figure(b)

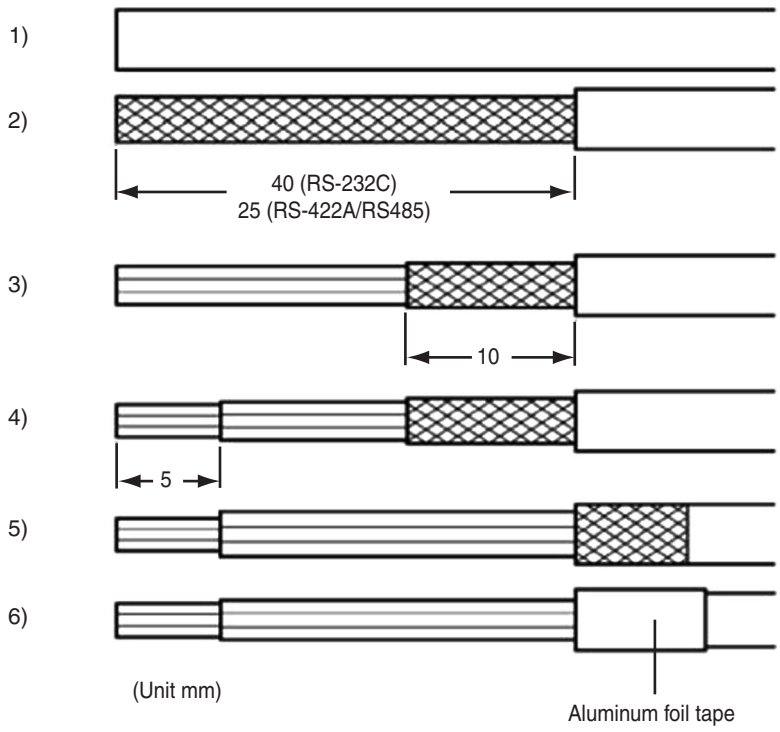


A-4 Fabrication of the Connection Cable

Fabricate the connection cable following the procedures below.

A-4-1 Cable Processing

1. Cut the cable to the required length.
2. Use a tool like a razor, etc. to cut off the ethylene peel of the cable. Be care not to damage the shielding layer (for grouping purpose)
3. Use a pair of scissors to snip off the shielding layer.
4. Bring out the core of each wire using a wire stripper.
5. Fold back the shielding layer.
6. Wrap the folded part of the shielding layer with aluminum foil tape.

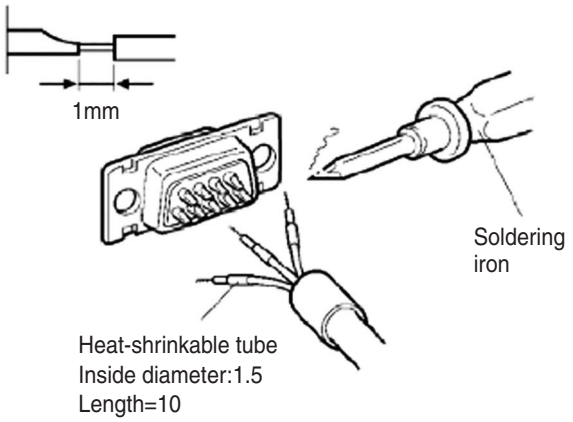


A-4-2 Soldering

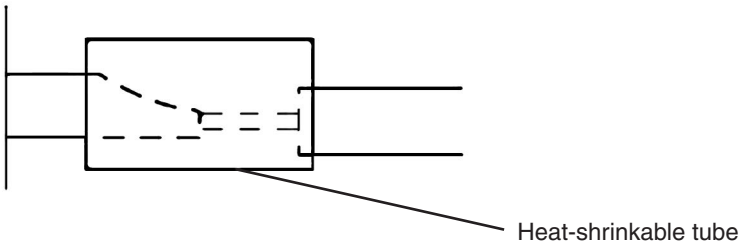
1 Sheathe each wire with a heat shrinkable tube.

2 Place some standby soldering tin on each wire and each pin of the connector.

3 Solder each wire and each pin of the connector.

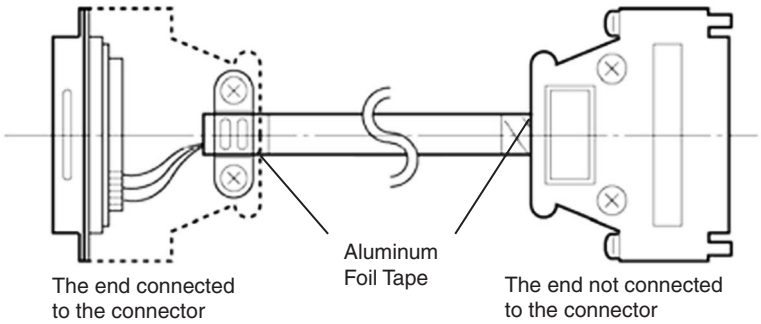


4 Pull the heat shrinkable tubes back to the soldering parts, heat them with a heat shrinking gun to make them shrink.



A-4-3 Shield Assembly

Assemble the connector shield as shown below.

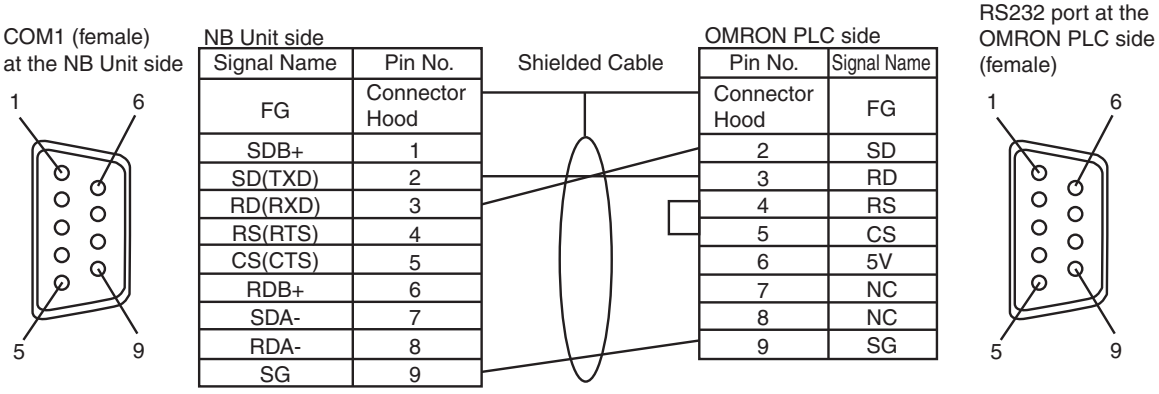


A-4-4 Method for Fabricating the Cable for Connection to OMRON PLC

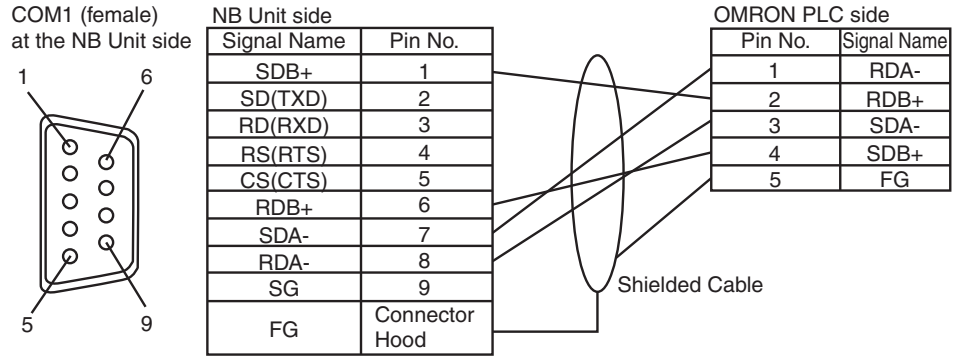
When fabricating the cable for connecting the NB Unit and OMRON PLC, refer to the following methods:

COM1

- **The cable for connecting the NB3Q Unit serial port COM1 to OMRON PLC (RS-232C)**

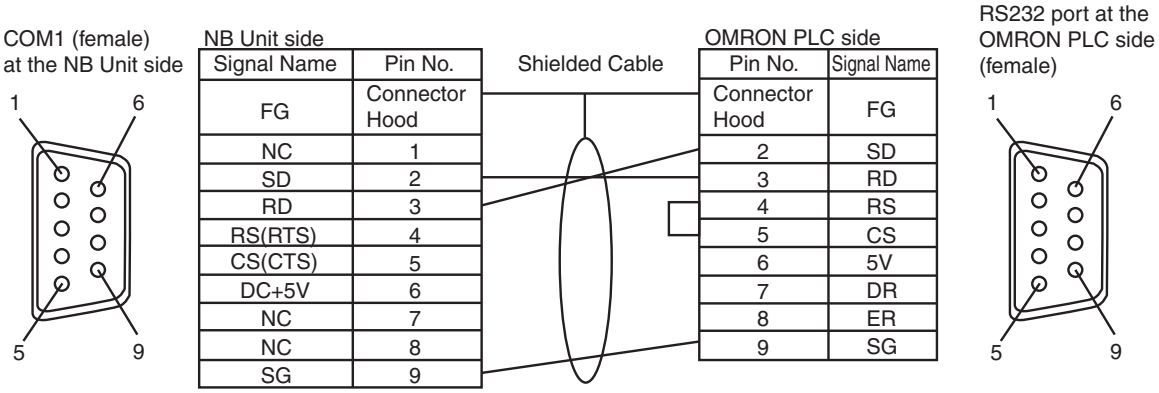


- **The cable for connecting the NB3Q Unit serial port COM1 to OMRON PLC (RS-422A)**



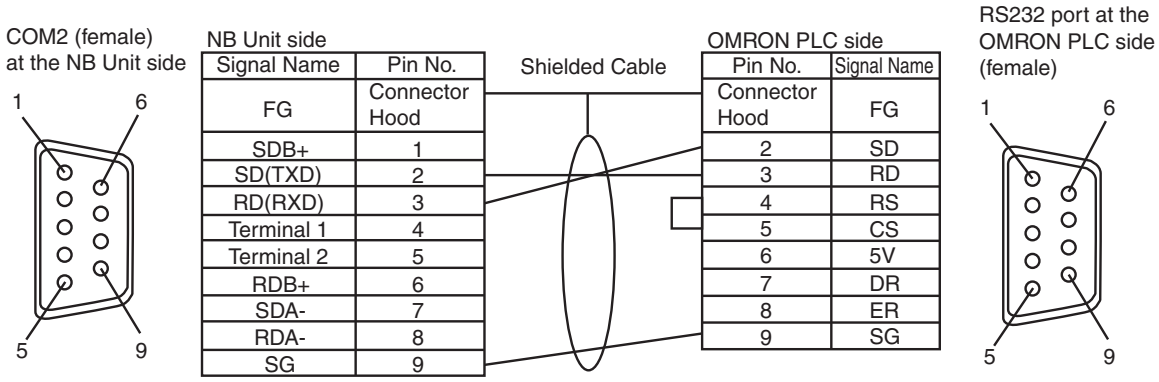
Note If the RS-485 connection is adopted, all needed to do is to connect the No.6 and No.8 pins and the shielded cable to the corresponding pins on the PLC side.

- **The cable for connecting the NB5Q/NB7W/NB10W Unit serial port COM1 to OMRON PLC (RS-232C)**

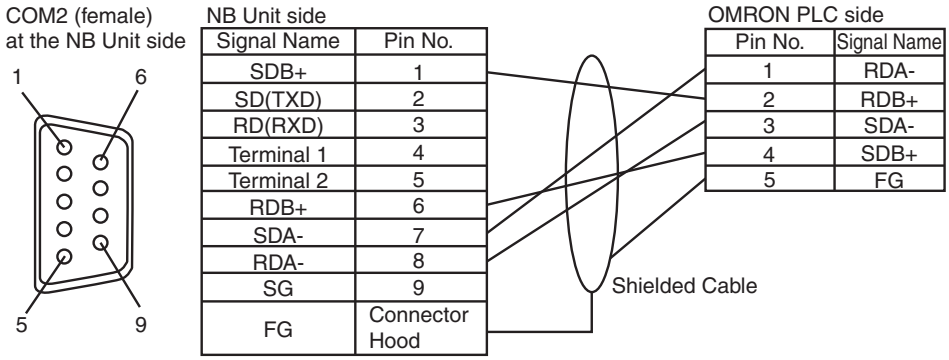


COM2

- **The cable for connecting the NB5Q/NB7W/NB10W Unit serial port COM2 to OMRON PLC (RS-232C)**



- **The cable for connecting the NB5Q/NB7W/NB10W Unit serial port COM2 to OMRON PLC (RS-422A)**



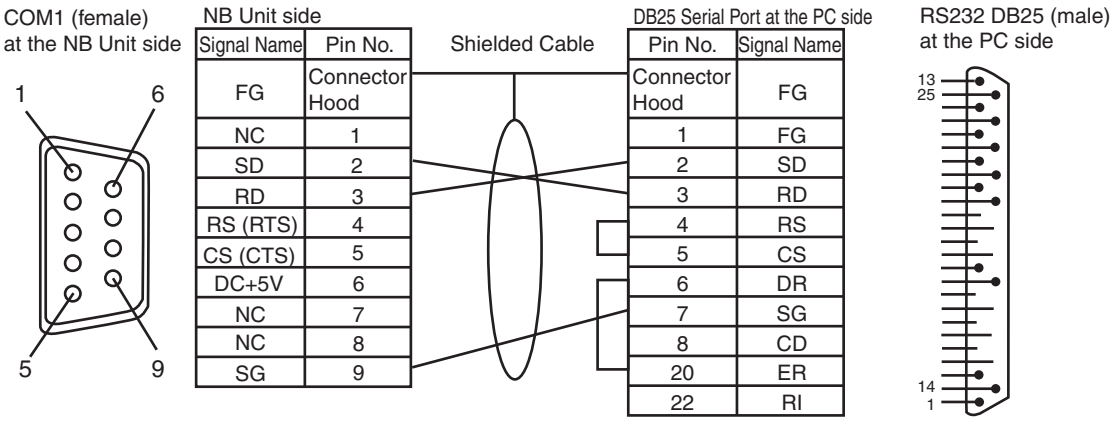
Note If the RS-485 connection is adopted, all needed to do is to connect the No.6 and No.8 pins and the shielded cable to the corresponding pins on the PLC side.

A-4-5 Method for fabricating the cable for connection to PC

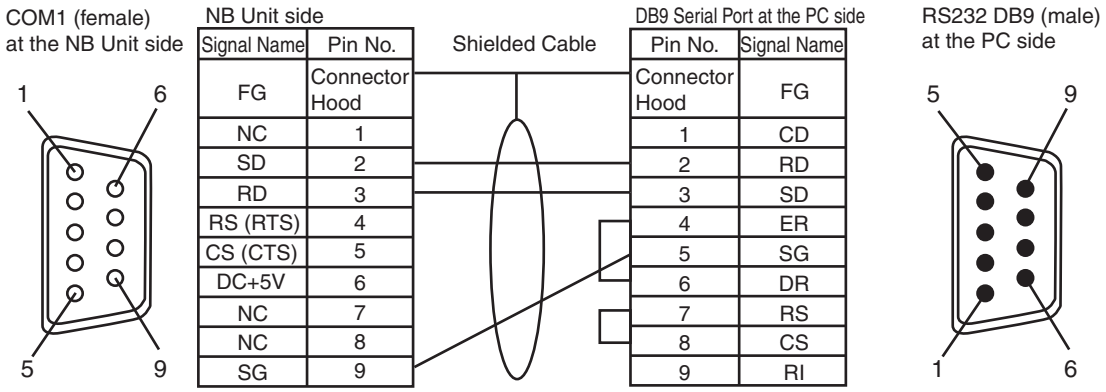
When fabricating the cable for connecting with NB-Designer, refer to the following methods:

Depending on the type of the RS-232C connector compatible with PCs according to DOS/V, deploy the wiring as shown below:

25-pin Connector



9-pin Connector



Note As to the 2 connection methods introduced above, the No.2, 3 and 9 pins of COM1 on the NB3Q unit side have the same definitions as those described in the above diagram, and the method for connection to a PC is also the same as above.

A-5 List of Models

NB Unit

Models	Resolution	Size	Communication	USB (Equivalent of USB 2.0 Full Speed)
NB3Q-TW00B	QVGA 320×240	3.5 inches	COM1	Slave
NB3Q-TW01B	QVGA 320×240	3.5 inches	COM1, Ethernet	Host, Slave
NB5Q-TW00B	QVGA 320×234	5.6 inches	COM1, COM2	Slave
NB5Q-TW01B	QVGA 320×234	5.6 inches	COM1, COM2, Ethernet	Host, Slave
NB7W-TW00B	WVGA 800×480	7 inches	COM1, COM2	Slave
NB7W-TW01B	WVGA 800×480	7 inches	COM1, COM2, Ethernet	Host, Slave
NB10W-TW01B	WVGA 800×480	10.1 inches	COM1, COM2, Ethernet	Host, Slave

Serial Communication Unit

Models	Specifications	Applicable PLCs
CS1W-SCU21	• RS-232C (2 ports)	CS series CS1G/H, CS1G/H-H
CS1W-SCU31	• RS-422A/485 (2 ports)	CS series CS1G/H, CS1G/H-H
CJ1W-SCU21	• RS-232C (2 ports)	CJ series CJ1G/H-H, CJ1M
CJ1W-SCU31	• RS-422A (2 ports)	CJ series CJ1G/H-H, CJ1M
CJ1W-SCU41	• RS-232C (1 port) • RS-422A (1 port)	CJ series CJ1G/H-H, CJ1M

Ethernet Communication Unit

Models	Specifications	Applicable PLCs
CS1W-ETN21	• 100Base-TX, 10Base-T	CS series CS1G/H, CS1G/H-H
CS1W-EIP21	• 100Base-TX, 10Base-T	CS series CS1G/H, CS1G/H-H
CJ1W-ETN21	• 100Base-TX, 10Base-T	CJ series CJ1G/H-H, CJ1M
CJ1W-EIP21	• 100Base-TX, 10Base-T	CJ series CJ1G/H-H, CJ1M
CP1W-CIF41	• 100Base-TX, 10Base-T	CP1H, CP1L, CP1E

PLC Series Connectable to NB Series through Host Link

PLC Series	Specifications
CP Series	Connecting through the RS-232C optional communication board (CP1W-CIF01) with a RS-232C cable
C200HE/HG/HX Series	With a connector for RS-232C connection (switch/9-pin type)
CQM1H Series	With a connector for RS-232C connection (9-pin type)
CPM1A Series	Connecting through the RS-232C adaptor (CPM1-CIF01) with a RS-232C cable
CPM2A Series	With a connector for RS-232C connection (9-pin type)
CPM2C Series	Connect to the branched RS-232C connector through a conversion cable (CPM2C-CN111 type)
CS Series	With a connector for RS-232C connection (9-pin type)
CJ Series	With a connector for RS-232C connection (9-pin type)

PLC Series connectable to NB Series through the Ethernet Unit

PLC Series	Specifications
CP Series	Connecting through the Ethernet optional communication board CP1W-CIF41
CS Series	Connecting through the Ethernet Unit CS1W-ETN21 or CS1W-EIP21
CJ Series	Connecting through the Ethernet Unit CJ1W-ETN21 or CJ1W-EIP21
CJ2 Series	Connecting through the Ethernet Unit CJ1W-ETN21 or CJ1W-EIP21

● Units at the host side which can be connected using the serial port of the NB Unit in the RS-232C mode through Host Link

PLC Series	CPU Unit with built-in Host Link function	CPU Unit that can be connected using Serial Communication Units/Boards	Options required for connection
CP Series		CP1L-L14/L20/M30/M40/M60	CP1W-CIF01
		CP1H-X40/XA40/Y20	CP1W-CIF01
	CP1E-N14/N20		
	CP1E-N30/N40/N60/NA20	CP1E-N30/N40/N60/NA20	CP1W-CIF01
		CP1L-EL20/EM30/EM40	CP1W-CIF01
C Series	C200HE-CPU42 C200HE-CPU42-Z	C200HE-CPU32/42 C200HE-CPU32/42-Z	C200HW-COM02/04/05/06-V1
	C200HG-CPU43/63 C200HG-CPU43/63-Z	C200HG-CPU33/43/53/63 C200HG-CPU33/43/53/63-Z	C200HW-COM02/04/05/06-V1
	C200HX-CPU44/64 C200HX-CPU44/64/65/85-Z	C200HX-CPU34/44/54/64 C200HX-CPU34/44/54/64/65/85-Z	C200HW-COM02/04/05/06-V1
	CPM1-10/20CDR-□ +CPM1-CIF01		
	CPM1A-10/20/30/40CD□-□ +CPM1-CIF01		
	CPM2A-30/40/60CD□□-□ +CPM1-CIF01 (When a peripheral port is connected)		
	CPM2C-10/20□□□□□□-□ (*1)		
	CQM1H-CPU11/21/51/61 (*2)	CQM1H-CPU51/61	CQM1H-SCB41
CS Series	CS1G-CPU42/43/44/45(-V1) CS1H-CPU63/64/65/66/67(-V1)	CS1G-CPU42/43/44/45(-V1) CS1H-CPU63/64/65/66/67(-V1)	CS1W-SCU21(-V1) CS1W-SCB21/41(-V1)
	CS1G-CPU42H/43H/44H/45H CS1H-CPU63H/64H/65H/66H/67H	CS1G-CPU42H/43H/44H/45H CS1H-CPU63H/64H/65H/66H/67H	CS1W-SCU21(-V1) CS1W-SCB21/41(-V1)
CJ Series	CJ1G-CPU44/CPU45	CJ1G-CPU44/CPU45	CJ1W-SCU21/41/-V1
	CJ1G-CPU42H/43H/44H/45H CJ1H-CPU65H/66H/67H	CJ1G-CPU42H/43H/44H/45H CJ1H-CPU65H/66H/67H	CJ1W-SCU21/41/-V1
	CJ1M-CPU11/12/13/21/22/23	CJ1M-CPU11/12/13/21/22/23	CJ1W-SCU21/41/-V1
	CJ2M-CPU31/32/33/34/35		CP1W-CIF01
	CJ2M-CPU11/12/13/14/15		
	CJ2H-CPU64/65/66/67/68(-EIP)		

*1: Connect using conversion cables (CPM2C-CN111 type or CS1W-CN114/118 type), the RS-232C adaptor (CPM1-CIF01 type) or the RS-422A adaptor (CPM1-CIF11 type).

*2: The CQM1H-CPU11 model does not have the RS-232C port built in the CPU, therefore it requires a peripheral port to be connected to a PT through a conversion cable (CS1W-CN118 type).

● Units at the host side which can be connected using the serial port of the NB Unit in the RS-422A mode through Host Link

PLC Series	CPU Unit with built-in Host Link function	CPU Unit that can be connected using Serial Communication Units/Boards	Options required for connection
CP Series	CP1L-L14/L20/M30/M40/M60	CP1L-L14/L20/M30/M40/M60	CP1W-CIF11/CIF12
	CP1H-X40/XA40/Y20	CP1H-X40/XA40/Y20	CP1W-CIF11/CIF12
	CP1E-N30/N40/N60/NA20	CP1E-N30/N40/N60/NA20	CP1W-CIF11/CIF12
		CP1L-EL20/EM30/EM40	CP1W-CIF11/CIF12
C Series		C200HE-CPU32/42 C200HE-CPU32/42-Z	C200HW-COM03/06-V1
		C200HG-CPU33/43/53/63 C200HG-CPU33/43/53/63-Z	C200HW-COM03/06-V1
		C200HX-CPU34/44/54/64 C200HX-CPU34/44/54/64/65/85-Z	C200HW-COM03/06-V1
	CPM1-10/20CDR-□ +CPM1-CIF11		
	CPM1A-10/20/30/40CD□-□ +CPM1-CIF11		
	CPM2A-30/40/60CD□□-□ +CPM1-CIF11 (When a peripheral port is connected)		
	CPM2C-10/20□□□□□□-□ (*1)		
		CQM1H-CPU51/61	CQM1H-SCB41
CS Series		CS1G-CPU42/43/44/45(-V1) CS1H-CPU63/64/65/66/67(-V1)	CS1W-SCB41(-V1) CS1W-SCU31(-V1)
		CS1G-CPU42H/43H/44H/45H CS1H-CPU63H/64H/65H/66H/67H	CS1W-SCB41(-V1) CS1W-SCU31(-V1)
CJ Series		CJ1G-CPU44/45	CJ1W-SCU31/41-V1
		CJ1G-CPU42H/43H/44H/45H CJ1H-CPU65H/66H/67H	CJ1W-SCU31/41-V1
		CJ1M-CPU11/12/13/21/22/23	CJ1W-SCU31/41-V1
	CJ2M-CPU31/32/33/34/35		CP1W-CIF11/CIF12
	CJ2M-CPU11/12/13/14/15		
	CJ2H-CPU64/65/66/67/68 (-EIP)		

*1: Connect using conversion cables (CPM2C-CN111 type or CS1W-CN114/118 type), the RS-232C adaptor (CPM1-CIF01 type) or the RS-422A adaptor (CPM1-CIF11 type).

● Units at the host side which can be connected using the Ethernet port of the NB Unit

PLC Series	CPU Unit with built-in Ethernet communication function	CPU Unit that can be connected through adding Ethernet Communication Unit/optional communication board	Options required for connection
CP Series		CP1L-L14/L20/M30/M40/M60	CP1W-CIF41
		CP1H-X40/XA40/Y20	CP1W-CIF41
		CP1E-N30/N40/N60/NA20	CP1W-CIF41
	CP1L-EL20/EM30/EM40		
CS Series		CS1G-CPU42/43/44/45(-V1) CS1H-CPU63/64/65/66/67(-V1)	CS1W-ETN21 CS1W-EIP21
		CS1G-CPU42H/43H/44H/45H CS1H-CPU63H/64H/65H/66H/67H	CS1W-ETN21 CS1W-EIP21
		CS1H-CPU63/64/65/66/67(-V1)	CS1W-ETN21 CS1W-EIP21
		CS1H-CPU63H/64H/65H/66H/67H	CS1W-ETN21 CS1W-EIP21
CJ Series		CJ1G-CPU42H/43H/44H/45H CJ1H-CPU65H/CPU66H	CJ1W-ETN21 CJ1W-EIP21
		CJ1M-CPU11/12/13/21/22/23	CJ1W-ETN21 CJ1W-EIP21
		CJ1H-CPU65H-R/66H-R/67H-R CJ1H-CPU65H/CPU66H	CJ1W-ETN21 CJ1W-EIP21
	CJ2M-CPU31/32/33/34/35		
		CJ2M-CPU11/12/13/14/15	CJ1W-ETN21 CJ1W-EIP21
	CJ2H-CPU64/65/66/67/68(-EIP)		
NJ Series	NJ501/301		

● NB-Designer Version information

Version	Release Time	Descriptions	Remarks
V1.0X	February 2012	PT with model number of NB5Q-TW00B and NB7W-TW00B supported	OS: Windows XP (SP3 or higher) Windows Vista/Windows 7 (32/64-bit) The NB-Designer incorporates a transmission program and a standard system program specified for the NB-Series Units. For download the application programs, please access your local Omron website, If local site cannot be found, please access Omron IA global site “http://www.ia.omron.com/ ” at first and select the area where you are.
V1.1X	June 2012	PT with model number of NB5Q-TW01B and NB7W-TW01B added	
V1.20	August 2012	PT with model number of NB3Q-TW00B/TW01B and NB10W-TW01B added AB/GC PLC supported English version added	
V1.21	October 2012	Besides English and Simplified Chinese, 7 languages supported (Traditional Chinese, Korean, Spanish, Italian, Portuguese, Turkish and Russian)	
V1.22	December 2012	Pictbridge printing supported Japanese version added	
V1.23	December 2012	OMRON PLC serial port communication protocol optimized The compatibility of the firmware upgrade improved	

● Related connecting objects

Cable with connectors (NB Unit ↔ PLC)

Models	Cable Length	Object Unit	Communications methods	Specifications
XW2Z-200T	2m	Units with 9-pin connectors by OMRON	Host Link (RS-232C)	9-pin ↔9-pin
XW2Z-500T	5m			
NB-RSEXT-2M	2m	RS-422/485 Communication Units by PLC manufacturers	Host Link (RS-422)	9-pin ↔5-wire

A-6 List of Options

● Protective Sheet

It adheres to the display preventing reflection and also dirt from sticking to the display. The sheet is colorless and transparent, with 1 set containing 5 pieces.

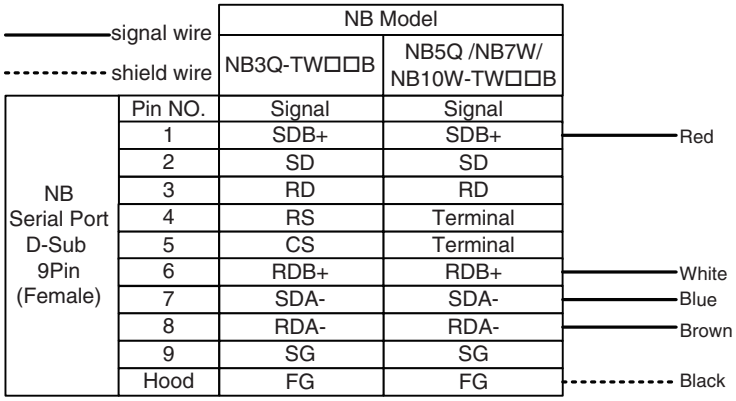
NB Unit Models	Models	Specifications
NB3Q-TW□□B	NB3Q-KBA04	5 pieces
NB5Q-TW□□B	NB5Q-KBA04	
NB7W-TW□□B	NB7W-KBA04	
NB10W-TW01B	NB10W-KBA04	

● Installation fittings

Models	Descriptions
NB5Q-ATT01	When PT users switch from the NT31/C or NQ5 Series to PT of NB5Q Series, due to the difference of the unit size, installation fittings can be utilized to guarantee the process quick and smooth.
NB10W-ATT01	When PT users switch from the NB10W-TW00B-Z Series to PT of NB10W-TW01B Series, due to the difference of the unit size, installation fittings can be utilized to guarantee the process quick and smooth.

● RS-422A/RS-485 Communication Cable

Models	Descriptions
NB-RSEXT-2M	Only applies to the COM2 port of the NB series product, when performing communications using RS-422A/RS485, can be equipped with this communication cable.



Conform to UL2464, AWG28

Cause a short circuit at terminal resistance.
How to use:
When NB5Q/NB7W/NB10W-TW□□B is used, open the connector of RS-422A/485 communication cable and cause a short circuit at PIN4 and PIN5. Make sure not to cause short circuit the other pins except PIN4 and PIN5. When the short circuit is completed, assemble the connector. When NB3Q-TW□□B Unit is used, set DIP switch SW3 to ON.

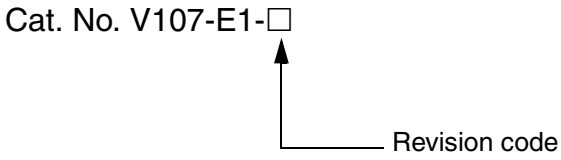
● USB Memory

It can be connected to the USB HOST port on the back of PT to perform the uploading, downloading, project operation and storage of related data.

Recommended Purchasing Model	Descriptions
FZ-MEM2G	USB disk with 2GB capacity manufactured by OMRON
FZ-MEM8G	USB disk with 8GB capacity manufactured by OMRON

Revision History

A manual revision code appears as a suffix to the Catalog number on the front cover of the manual.



Revision code	Date	Revised content
01	October 2011	Original production
02	February 2012	• Adding optional RS-422A / RS485 communication cable in Appendix-6. • Correcting the descriptions of the battery.
03	April 2012	Adding descriptions and new functions of NB5Q/NB7W-TW01B model.
04	August 2012	Adding descriptions and new functions of NB3Q-TW00B/TW01B and NB10W-TW01B models.
05	October 2012	• Correcting the settings for CS1W-ETN21. • Deleting content related to C200-LK201/LK202.
06	December 2012	• Correction related to the backlight lamp and rubber packing maintenance in Precautions for Safe Use. • Adding descriptions of the Pictbridge printing function.
07	December 2012	• Adding descriptions of the power supply and wire connection in Precautions for Safe Use. • Adding notes of the specifications in Appendix.
08	April 2013	Changes and corrections

Terms and Conditions of Sale

1. Offer; Acceptance. These terms and conditions (these "Terms") are deemed part of all quotes, agreements, purchase orders, acknowledgments, price lists, catalogs, manuals, brochures and other documents, whether electronic or in writing, relating to the sale of products or services (collectively, the "Products") by Omron Electronics LLC and its subsidiary companies ("Omron"). Omron objects to any terms or conditions proposed in Buyer's purchase order or other documents which are inconsistent with, or in addition to, these Terms.
2. Prices; Payment Terms. All prices stated are current, subject to change without notice by Omron. Omron reserves the right to increase or decrease prices on any unshipped portions of outstanding orders. Payments for Products are due net 30 days unless otherwise stated in the invoice.
3. Discounts. Cash discounts, if any, will apply only on the net amount of invoices sent to Buyer after deducting transportation charges, taxes and duties, and will be allowed only if (i) the invoice is paid according to Omron's payment terms and (ii) Buyer has no past due amounts.
4. Interest. Omron, at its option, may charge Buyer 1-1/2% interest per month or the maximum legal rate, whichever is less, on any balance not paid within the stated terms.
5. Orders. Omron will accept no order less than $200 net billing.
6. Governmental Approvals. Buyer shall be responsible for, and shall bear all costs involved in, obtaining any government approvals required for the importation or sale of the Products.
7. Taxes. All taxes, duties and other governmental charges (other than general real property and income taxes), including any interest or penalties thereon, imposed directly or indirectly on Omron or required to be collected directly or indirectly by Omron for the manufacture, production, sale, delivery, importation, consumption or use of the Products sold hereunder (including customs duties and sales, excise, use, turnover and license taxes) shall be charged to and remitted by Buyer to Omron.
8. Financial. If the financial position of Buyer at any time becomes unsatisfactory to Omron, Omron reserves the right to stop shipments or require satisfactory security or payment in advance. If Buyer fails to make payment or otherwise comply with these Terms or any related agreement, Omron may (without liability and in addition to other remedies) cancel any unshipped portion of Products sold hereunder and stop any Products in transit until Buyer pays all amounts, including amounts payable hereunder, whether or not then due, which are owing to it by Buyer. Buyer shall in any event remain liable for all unpaid accounts.
9. Cancellation; Etc. Orders are not subject to rescheduling or cancellation unless Buyer indemnifies Omron against all related costs or expenses.
10. Force Majeure. Omron shall not be liable for any delay or failure in delivery resulting from causes beyond its control, including earthquakes, fires, floods, strikes or other labor disputes, shortage of labor or materials, accidents to machinery, acts of sabotage, riots, delay in or lack of transportation or the requirements of any government authority.
11. Shipping; Delivery. Unless otherwise expressly agreed in writing by Omron:
    a. Shipments shall be by a carrier selected by Omron; Omron will not drop ship except in "break down" situations.
    b. Such carrier shall act as the agent of Buyer and delivery to such carrier shall constitute delivery to Buyer;
    c. All sales and shipments of Products shall be FOB shipping point (unless otherwise stated in writing by Omron), at which point title and risk of loss shall pass from Omron to Buyer; provided that Omron shall retain a security interest in the Products until the full purchase price is paid;
    d. Delivery and shipping dates are estimates only; and
    e. Omron will package Products as it deems proper for protection against normal handling and extra charges apply to special conditions.
12. Claims. Any claim by Buyer against Omron for shortage or damage to the Products occurring before delivery to the carrier must be presented in writing to Omron within 30 days of receipt of shipment and include the original transportation bill signed by the carrier noting that the carrier received the Products from Omron in the condition claimed.
13. Warranties. (a) Exclusive Warranty. Omron's exclusive warranty is that the Products will be free from defects in materials and workmanship for a period of twelve months from the date of sale by Omron (or such other period expressed in writing by Omron). Omron disclaims all other warranties, express or implied. (b) Limitations. OMRON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, ABOUT NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OF THE PRODUCTS. BUYER ACKNOWLEDGES THAT IT ALONE HAS DETERMINED THAT THE PRODUCTS WILL SUITABLY MEET THE REQUIREMENTS OF THEIR INTENDED USE. Omron further disclaims all warranties and responsibility of any type for claims or expenses based on infringement by the Products or otherwise of any intellectual property right. (c) Buyer Remedy. Omron's sole obligation hereunder shall be, at Omron's election, to (i) replace (in the form originally shipped with Buyer responsible for labor charges for removal or replacement thereof) the non-complying Product, (ii) repair the non-complying Product, or (iii) repay or credit Buyer an amount equal to the purchase price of the non-complying Product; provided that in no event shall Omron be responsible for warranty, repair, indemnity or any other claims or expenses regarding the Products unless Omron's analysis confirms that the Products were properly handled, stored, installed and maintained and not subject to contamination, abuse, misuse or inappropriate modification. Return of any Products by Buyer must be approved in writing by Omron before shipment. Omron Companies shall not be liable for the suitability or unsuitability or the results from the use of Products in combination with any electrical or electronic components, circuits, system assemblies or any other materials or substances or environments. Any advice, recommendations or information given orally or in writing, are not to be construed as an amendment or addition to the above warranty. See http://www.omron247.com or contact your Omron representative for published information.
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15. Indemnities. Buyer shall indemnify and hold harmless Omron Companies and their employees from and against all liabilities, losses, claims, costs and expenses (including attorney's fees and expenses) related to any claim, investigation, litigation or proceeding (whether or not Omron is a party) which arises or is alleged to arise from Buyer's acts or omissions under these Terms or in any way with respect to the Products. Without limiting the foregoing, Buyer (at its own expense) shall indemnify and hold harmless Omron and defend or settle any action brought against such Companies to the extent based on a claim that any Product made to Buyer specifications infringed intellectual property rights of another party.
16. Property; Confidentiality. Any intellectual property in the Products is the exclusive property of Omron Companies and Buyer shall not attempt to duplicate it in any way without the written permission of Omron. Notwithstanding any charges to Buyer for engineering or tooling, all engineering and tooling shall remain the exclusive property of Omron. All information and materials supplied by Omron to Buyer relating to the Products are confidential and proprietary, and Buyer shall limit distribution thereof to its trusted employees and strictly prevent disclosure to any third party.
17. Export Controls. Buyer shall comply with all applicable laws, regulations and licenses regarding (i) export of products or information; (iii) sale of products to "forbidden" or other proscribed persons; and (ii) disclosure to non-citizens of regulated technology or information.
18. Miscellaneous. (a) Waiver. No failure or delay by Omron in exercising any right and no course of dealing between Buyer and Omron shall operate as a waiver of rights by Omron. (b) Assignment. Buyer may not assign its rights hereunder without Omron's written consent. (c) Law. These Terms are governed by the law of the jurisdiction of the home office of the Omron company from which Buyer is purchasing the Products (without regard to conflict of law principles). (d) Amendment. These Terms constitute the entire agreement between Buyer and Omron relating to the Products, and no provision may be changed or waived unless in writing signed by the parties. (e) Severability. If any provision hereof is rendered ineffective or invalid, such provision shall not invalidate any other provision. (f) Setoff. Buyer shall have no right to set off any amounts against the amount owing in respect of this invoice. (g) Definitions. As used herein, "including" means "including without limitation"; and "Omron Companies" (or similar words) mean Omron Corporation and any direct or indirect subsidiary or affiliate thereof.

Certain Precautions on Specifications and Use

1. Suitability of Use. Omron Companies shall not be responsible for conformity with any standards, codes or regulations which apply to the combination of the Product in the Buyer's application or use of the Product. At Buyer's request, Omron will provide applicable third party certification documents identifying ratings and limitations of use which apply to the Product. This information by itself is not sufficient for a complete determination of the suitability of the Product in combination with the end product, machine, system, or other application or use. Buyer shall be solely responsible for determining appropriateness of the particular Product with respect to Buyer's application, product or system. Buyer shall take application responsibility in all cases but the following is a non-exhaustive list of applications for which particular attention must be given:
   (i) Outdoor use, uses involving potential chemical contamination or electrical interference, or conditions or uses not described in this document.
   (ii) Use in consumer products or any use in significant quantities.
   (iii) Energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, and installations subject to separate industry or government regulations.
   (iv) Systems, machines and equipment that could present a risk to life or property. Please know and observe all prohibitions of use applicable to this Product.
   NEVER USE THE PRODUCT FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY OR IN LARGE QUANTITIES WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON'S PRODUCT IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.
2. Programmable Products. Omron Companies shall not be responsible for the user's programming of a programmable Product, or any consequence thereof.
3. Performance Data. Data presented in Omron Company websites, catalogs and other materials is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of Omron's test conditions, and the user must correlate it to actual application requirements. Actual performance is subject to the Omron's Warranty and Limitations of Liability.
4. Change in Specifications. Product specifications and accessories may be changed at any time based on improvements and other reasons. It is our practice to change part numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the Product may be changed without any notice. When in doubt, special part numbers may be assigned to fix or establish key specifications for your application. Please consult with your Omron's representative at any time to confirm actual specifications of purchased Product.
5. Errors and Omissions. Information presented by Omron Companies has been checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical or proofreading errors or omissions.

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